THE UNIVERSITY
of EDINBURGH

FOLLOW THE BOTTLE:
PET RECYCLING ECONOMY AND WASTE PICKER EMPOWERMENT IN BRAZIL

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PhD in International Development

The University of Edinburgh

January 2020

DECLARATION

I confirm that this thesis presented for the degree of PhD in International Development, has

i) been composed entirely by myself;
ii) been solely the result of my own work;
iii) not been submitted for any other degree or professional qualification.

Tatianna Mello Pereira da Silva

To Pedro, Caio and the little jellybean that just joined our bunch,
my better half and my all in all.

Acknowledgements

It may sound dramatic to put it like this, but this process did feel endless. If it had only been for myself, I would probably have given up. Although this thesis was a solo enterprise, its completion was only possible because so many other people graciously dedicated their time and care to making it happen; therefore, to give up would not have been fair. The words written here are of my own creation, but they are the end result of a support network that has helped me on many ways and every member of which deserves my most sincere gratitude. Writing a thesis is something you do once in a lifetime (I hope), so I will run the risk of sounding mushy in order to acknowledge here things that have perhaps never been said, but were dearly felt. To the research participants, most importantly to the waste pickers at *Lixão da Estrutural* and *Recicle a Vida*, whom I will not dare attempt to list for fear of being let down by my awful memory, for sharing their knowledge and life stories. I did my best to do justice to the rich foundation you provided for my work. I owe this thesis to you. To my supervisors, Jamie Furniss and Samantha Staddon, who have always been there to provide critically constructive feedback, encourage my analytical thinking and make me believe it was possible. I feel very lucky to have been supervised by you both. To the examiners, Mike Crang and Jacob Doherty, for so generously sharing their time and knowledge, and putting so much effort into helping me to strengthen my arguments and improving my thesis, making the viva a truly pleasant experience. To my office-mates from room 5.15 for making this PhD journey a lot more bearable and showing me that reaching this stage was achievable. To Sarita and Amit for being the best companions I could ask for in facing this perfect storm. I wish we had spent more time together, and truly hope we will be reunited soon. To Ray, my best friend, for staying close to me even in my most "egothesistical" moments. I will hold onto your friendship for life. To Juliana, a wonderful surprise during this journey, for making me look to the past with more candid eyes and envisioning a future of sisterhood. Beyond blood, our bonds are based on choice. To Valéria for looking after Caio as she would have looked after her own child and to Cléia for listening to my post-lunch complaints this past year. You were so helpful! To Jane and Milton, my parents-in-law, for being so happily available to take care of Caio even after a busy working day, and for so warmly and generously welcoming us into their home, pampering us in every possible way. I feel incredibly privileged to have you in my life. To my grandmother for always having such high expectations of me and feeling so proud of my accomplishments. It took longer than I expected, but I did it. To Tio Lu and to my mom for always being there, body and soul, for me and Caio. We are so very lucky to have you. To my mom for prioritising my dreams over her own, making me feel so tenderly loved, and sparing no effort to invest in the best inheritance one could ask for: education. I love you dearly and I am glad to have you by my side. To Pedro for forgiving my absence and for being the one I want to spend my time with. You bring music and meaning to my life: "Enquanto a chama arder, todo dia te ver passar. Tudo viver ao teu lado com o arco da promessa no azul pintado para durar". To Caio for bringing peace to my heart and quietude to my mind, making everything worth it. I love you with my heart and soul. You are all that matters! Not least, to the Leverhulme Trust for financially supporting this thesis and my desire to learn. This opportunity has certainly changed my life for the better.

ABSTRACT

This thesis seeks to understand and problematise waste pickers' underprivileged socioeconomic condition in Brazil from the perspective of their active participation in the recycling economy. It uses a Cultural Political Economy informed analytical toolkit that includes a political-economic, a semiotic, a material and a spatio-temporal dimension to examine how the recycling economy is configured in Brazil. Premised on the adverse incorporation of waste pickers into the economy, it further asks how and in what ways their participation may take place on unfavourable terms.

Academic literature concerned with waste pickers' empowerment, especially in the Brazilian context, typically advocates for their organisation around collectives and the subsequent formalisation of their work by local authorities as providers of waste management services. Implicit in that literature is the assumption that informality is the root cause of their vulnerable socioeconomic condition and, hence, that empowering them entails expanding the reach of our current market-oriented development model, incorporating them into the so-called formal economy. Critiquing the formalisation and cooperatisation approach, this thesis rejects the dichotomous view of the economy (formal-informal) upon which the prevailing literature is based.

The Global Production Network approach, with its focus on the social processes that underpin the global economy, provides the methodological schema used to navigate the complex interconnections of places, scales, actors and processes that constitute the PET recycling economy. The investigation unfolds using 'follow-the-thing' as a research technique. PET (polyethylene terephthalate) bottles are the thing selected to follow.

My 7-month-long fieldwork journey started at *Lixão da Estrutural*, located in Brasília, which used to be one of the biggest dumpsites in Latin America and progressed until the point where PET bottles were repurposed into a new product, ready to re-enter the consumer market. To move along the recycling network, I used a snowball referral technique and a mixture of interviews and participant observation with waste pickers, brokers, wholesalers and recyclers, as well as with representatives of a sectoral association and of governmental bodies.

The ultimate aim of this thesis is to denaturalise and re-politicise the prevailing academic approach to the study of the causes of waste pickers' poverty exposing some of the mechanisms in operation to constrain their power, their capacity to capture value, and the extent of their embeddedness in the recycling economy. In so doing, it hopes to contribute to opening up new forms of actions previously unthought-of for the promotion of waste pickers' empowerment.

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1. INTRODUCTION

> *[d]evelopment is interested not so much in the growth of an economy but rather the conditions under which production occurs and the results that flow from it. In term of conditions, development pays attention to the environments affected by economic activity and to the labor relations and conditions of the actual producers – the peasants and workers who produce growth. If growth wrecks the environment, deadens working life, or grabs land from reluctant farmers, it is not truly development. (...) Development attends to the social consequences of production. If growth concentrates wealth in the hands of a few, it is not development. Most contentiously, development analyzes who controls production and consumption. If the growth process is controlled by a few powerful people rather than the many people who work to make it possible, it is not development. (...) If growth is the outcome of market processes that no one controls – although a few people benefit – it is not development. Development is optimistic and utopian – it means changing the world for the better, starting at the bottom rather than the top.*
>
> Peet and Hartwick (2015:2–3)

Development: meanings and contradictions

Desenvolvimento, the Portuguese word for development, hides a curious and unusual meaning which is obscured by its recurrent and appealing use as synonym for growth, expansion and progress, the common pursuit of most likely every nation on Earth. When its parts are dissected and analysed morphologically, however, *desenvolvimento* acquires a completely different definition. The verb *desenvolver*,

from which the noun derives, is composed of the prefix *des*, implying negation, similar to the English prefixes “non” and “un”, and the radical *envolver*: to involve; to include. *Desenvolvimento* can therefore also be literally translated into English as non-involvement. Although secondary, this meaning is critical, since the conceptual idea of development in its ordinary usage, whose historical evolution has been traced by Esteva (2010) as far back as the 18th century, has evolved to encompass a concern with representativeness, participation and inclusiveness, as epitomised in the slogan for the United Nations’ 2030 Agenda for Sustainable Development: “leave no one behind”.

The contradiction between the primary and secondary meanings of *desenvolvimento* is, however, only conceptual since, unfortunately, development has not generally been practiced in a way that allows for the active participation of all – if by participation we understand the ability to contribute to shaping frames of reference and reaping and enjoying the benefits that might accrue from such. In practice, the dynamic of development has become a merger of its conceptual meanings; i.e. development is growth and betterment, but just not for everyone. This contention is aligned with Peet and Hartwick’s (2015:1) claim that “development can be used for many different political purposes, including some, and perhaps most, that conflict with its essentially egalitarian ethic (‘a better life for *all*’)”. As the authors go on to argue, “the idea of development can be used to legitimate what in fact amounts to more money and power for a few” (Peet and Hartwick 2015:1).

More than simply failing to be participative, the model of development that prevails globally, and which is based on neoliberal ideals, “converts participation into a manipulative trick to involve people in struggles for getting what the powerful

want to impose on them" (Esteva 2010:3), despite being discursively integrative and concerned with inclusiveness. Lukes' (2005) reflections on power, particularly when discussing the paradox facing social scientists interested in investigating power as a social phenomenon, are elucidating in this respect. According to him, "power is real and effective in a remarkable variety of ways, some of them indirect and some hidden, and that, indeed, *it is at its most effective when least accessible to observation, to actors and observers alike*, thereby presenting empirically minded social scientists with a neat paradox" (Lukes 2005:64 emphasis added). Hence, the process of imposing preferences upon people does not always imply coercion or the use of force by the powerful; it can happen in subtle and subliminal ways, i.e. what Esteva (2010) refers to as a manipulative trick.

Even researchers openly and genuinely committed to empowering the most vulnerable can be said to have fallen for this manipulative trick, proposing frameworks and alternatives that seemingly address the contradictions that our neoliberal development model entails, but that in fact do not go deep enough to challenge and shake its structure. Their efforts, though well-intentioned, often go only far enough to scratch the surface, generating a feeling that things are changing that comes at the cost of creating an enabling environment for things to remain the same, therefore making an unintended contribution to the prolongation of the current failing development model. The prevailing approach adopted by academics and policymakers to empowering waste pickers in Brazil – understood as individuals whose livelihoods depend solely or in part on reclaiming and selling recyclables from waste – is precisely one such example. Based on the promotion of waste pickers' integration into municipal solid waste management systems through the

establishment of cooperatives and the formalisation of their work by local authorities, scholars are moved by an integrative development logic, but end up drawing attention away from mechanisms operating beyond the city level and which obstruct the attainment of waste pickers' emancipation, acting instead to legitimise a development model that is not inclusive. This is one of the core arguments that will be made in this thesis and which motivates this research. I shall begin by describing the waste pickers to whom I am referring, exposing the reasons why there is a need for a fundamental shift in their position – as a group – within what counts as 'development'.

The many facets of waste pickers' poverty

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In one of my numerous visits to 'Lixão da Estrutural', which back in 2016 was the biggest dumpsite in operation in Brazil, I took my husband, hoping that the experience would help me in raising his awareness of the importance of recycling. He never knew my true intent – and may only be finding out as he reads this now – for, if he did, he would not have been open to the experience. He assumed I wanted him to come to provide safety for me. On that day, I had scheduled an interview with the director of a network of cooperatives operating in the Federal District. She arranged for us to convene at a nursery located close to the dumpsite entrance. As we arrived, some boys were playing soccer in the street. They were the sons of waste pickers and lived in the neighbourhood. As my husband waited for me to carry out the interview, he befriended the boys and, being a soccer fan, gladly joined the game. It was a hot day and the interview took a while, so by the time I reconvened with him, he and the boys were soaked and thirsty. To thank them for the fun afternoon, my husband offered to buy a bottle of Coca-Cola and asked them where the closest shop was. The boys were thrilled by the mere mention of the word Coca-Cola. My husband had absolutely no intention of impressing them, and offered a Coca-Cola as something trivial, because they were kids… and thirsty ones. The reality then hit us. It is so easy to forget our own privileges. As we came to realise, something for us as meaningless as a bottle of Coca-Cola was highly special and valuable to them. It was clear that this modest luxury was not a part of their lives, at least not to the point of being as natural and trifling as it was for us, and was probably too superfluous for their parents to afford. We got them three bottles of cola. As I watched them having

fun controlling the length of each other's sips to make sure that everyone would have an equal share of the drink, I started thinking about the sad irony of their lives: their families' livelihoods depend on selling reclaimed bottles of a product they cannot afford. As one research participant later said, "bottled beverages are a rich people thing".

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The livelihood of a large contingent of people in the Global South is dependent on foraging for recyclables from waste. Medina (2007) estimates the size of this group at about 1% of the urban population of developing countries, or over 15 million people worldwide. In Brazil alone, according to a report prepared by IPEA (2013) – the Portuguese acronym for the Brazilian Institute for Applied Economic Research – there are between 400,000 and 600,000 such waste pickers, as they are commonly referred to in the academic literature. This figure includes both individuals who collect waste as their main economic activity, and those who do so to complement other sources of income. The same report provides details of these waste pickers' socioeconomic profile at the national level, as well as breaking the data down by macro-region of the country (North, Northeast, Midwest, South and Southeast), given major regional disparities in most socioeconomic and demographic indicators across the country (see Table 1).

Although it dates from 2013, the IPEA report is a valuable compilation of the most recent available official statistical data on waste pickers in Brazil. Amongst its findings, it indicated that waste pickers' average monthly earnings corresponded to the minimum wage then in effect, with the exception of waste pickers in the Northeast of Brazil, whose average income fell below that threshold. Differences in income were also observed depending on gender and race. Women earned 30% less than men in general, while white waste pickers made on average 22% more money

than their black counterparts. In fact, the proportion of black individuals among waste pickers (66.1%) was higher than the proportion of black individuals in the Brazilian population as a whole (52%); a not-so-surprising fact given the persistence of racial inequality in Brazil, which results in black people being socioeconomically underprivileged. The study further revealed that the rate of illiteracy among waste pickers was 20.5% – twice the Brazilian national rate – which is again unsurprising, since only a quarter of those waste pickers aged 25 or older finished elementary school, which is half the Brazilian national rate. Two thirds of the waste pickers worked autonomously, i.e. without an employment contract, and less than a fifth paid National Insurance contributions. In the Northeast and North, only 6% and 7% of the waste pickers, respectively, made payments to the National Insurance Fund. Workers who do not pay National Insurance do not qualify for certain social security benefits such as state pension and allowances due to illnesses, disabilities, unemployment, and maternity/paternity leave. Such low coverage rate is particularly worrisome given that nearly half of waste pickers were between 30 and 49 years old, and 22% were over 50 (IPEA 2013).

Table 1

Summary of the Socioeconomic Profile of Waste Pickers – Brazil, 2012

Category	Factor	Brazil	South	South-east	North-east	Mid-west	North
Demographic factor	Average age	39.4	38.9	40.6	38.3	40.0	36.5
	Women (%)	31.1	34.0	30.9	29.3	34.1	29.5
	Black (%)	66.1	41.6	63.0	78.5	71.3	82.0
	Waste pickers residing in urban areas (%)	93.3	93.5	96.2	88.5	95.6	93.2
Labour and income	Formally employed waste pickers (%)	38.6	32.2	45.7	33.8	38.4	29.0
	Average income (R$)	571.56	596.90	629.89	459.34	619.00	607.25
National Insurance	Waste pickers paying National Insurance (%)	15.4	25.9	17.1	6.2	10.6	7.4
Education	Illiteracy rate among waste pickers (%)	20.5	15.1	13.4	34.0	17.6	17.2
	Waste pickers aged 25 or older who finished elementary school (%)	24.6	20.6	28.3	20.4	23.9	30.0

Note. Adapted from *Situação social das catadores e dos catadores de material reciclável e reutilizável – Brasil* (p.44-45) by IPEA – Instituto de Pesquisa Econômica Aplicada, 2013, Brasília. IPEA.

Still, according to the report, waste pickers are responsible for reclaiming an impressive 90% of all materials that are recycled in Brazil (IPEA 2013). This is not so surprising, however, since according to data collected by the Ministry for Regional Development's Office of Sanitation, only one out of five Brazilian cities had an official recycling scheme run by the respective local authority in 2017, whether through the provision of door-to-door collection of source-segregated

recyclables, or through ‘bring schemes’ where householders are responsible for bringing their own recycling to designated collection points (Ministério do Desenvolvimento Regional 2019). In fact, local authorities, which are constitutionally responsible for the provision of waste management services in Brazil, as in most countries, recycled only 1.5% of the 60 million tonnes of municipal solid waste generated in Brazil in 2017 (Ministério do Desenvolvimento Regional 2019). This implies that most waste is unsorted and ends up in sanitary landfills (70%), open dumps (12%) and controlled dumpsites with no sealant liner to protect the groundwater (11%) (Ministério do Desenvolvimento Regional 2019), providing an idea of the general working conditions of waste pickers. Even for those who do not work at final disposal sites, reclaiming recyclables means shuffling through bags of unsorted waste in dustbins around their various cities.

Having grown up in a major urban centre in Brazil, seeing these men and women toiling around the city, pushing their carts through the streets in the midst of traffic was part of my daily life. It was hard not to be moved by their struggle or to feel uneasy due to the sheer contrast between their poverty and the wealth of the neighbourhoods through which they usually roam, looking for recyclables. Their capacity to earn a living through something deemed valueless by others has always triggered my curiosity and respect, which they have also earned for the environmental service they provide through their work.

With waste recently becoming a trending topic around the globe, thanks largely to the dramatic rise in the price of natural resources since 2000 and to shortages in the availability of rare earth and precious metals required for the production of electronics (Ellen MacArthur Foundation 2013), my attention has

gradually turned towards waste pickers as an object of study. They are avant-garde representatives of a much-praised circular economy model, acclaimed by authorities around the world as the way forward. Still, they face high levels of poverty, understood from a multidimensional perspective, to the point of treasuring a bottle of Coca-Cola. Under a development paradigm that claims to be inclusive, how can they continue to be poor? And what can be done to change that? These questions have motivated this research and inspired many authors from different fields of expertise, particularly anthropology and geography, as well as activists and policymakers. The following section presents an overview of efforts to empower waste pickers in Brazil since the 1990s from a policy perspective. Next, a section briefly examining and critiquing the prevailing theoretical approach adopted by scholars fighting against waste pickers' poverty in Brazil, as well as elsewhere in the Global South, and outlining the alternative theoretical framework upon which this thesis is grounded.

The effort to empower waste pickers in Brazil

Since the 1990s, and more pronouncedly since the 2000s, a rising concern with the precariousness of waste pickers' jobs and lives in Brazil has driven the proliferation of initiatives and laws aimed at improving their condition and alleviating their poverty. However, waste picking emerged as an economic activity much earlier on – Gill (2010) claims it is "perhaps the second oldest profession in the world" – and seems to have grown considerably from the 1970s onwards, when the process of urbanisation took off and for the first time the majority of the Brazilian population was living in cities. For years, this population lived and toiled under a veil of invisibility, which was gradually lifted thanks largely to the work of Catholic

groups dedicated to rescuing their citizenry by encouraging them to stand up for their rights (Gonçalves, Oliveira, and Silva 2008). Through their intervention, autonomous waste pickers started uniting and organising themselves into collectives as early as 1986 in São Paulo and Porto Alegre, and 1990 in Belo Horizonte, where seven years later the local authority pioneered the first selective waste management project with participation from waste pickers run in Brazil (Pereira and Teixeira 2011).

During the following years, waste pickers continued to articulate their demands both locally and nationally, to the point of convening a major conference in Brasília in 2001, during which they founded the National Movement of Collectors of Recyclable Materials (MNCR, in Portuguese) to represent their interests. On this occasion, they launched a manifesto condemning their societal and financial exclusion and demanding the regulation of their profession and more inclusive models of waste management that would legitimise their work. The timing of their mobilisation as a political group could not have been more auspicious. Two years later, in 2003, Luiz Inácio Lula da Silva, a member of the Brazilian Labour Party sensitive to the cause of waste pickers, acceded to the presidency. Through the eight years of his mandate, waste pickers received substantial support.

An Interministerial Committee for the Socioeconomic Inclusion of Waste Pickers with representatives from 13 ministries, the MNCR and major public financial institutions was set up in 2003 to coordinate national action towards the promotion of better living and working conditions for waste pickers. In parallel, a legal framework was devised to promote their socioeconomic inclusion. Presidential Decree 5,940, enacted in 2006, instituted the selective collection of waste (e.g. segregation of dry and wet waste at source) in all buildings of federal agencies and

bureaus, and mandated the donation of recyclable waste to duly constituted cooperatives of waste pickers. The National Policy of Basic Sanitation (Act 11.445) of 2007 exempted local authorities from the duty to tender when hiring cooperatives of waste pickers as providers of selective waste collection.

The National Waste Policy (PNRS), enacted in 2010 after 20 years of proceedings, mandates all spheres of government to develop a solid waste management plan taking into account, among other things, actions, programmes and/or targets to promote the social inclusion and economic emancipation of waste pickers. The PNRS also grants local authorities that establish partnerships with waste pickers for the provision of waste management services priority in the allocation of public funds to implement waste-related projects. Finally, Decree 7,405 of 2010 instituted the *Programa Pró-Catador*, a national programme aimed at providing technical and financial support to build capacity, equip and reinforce waste pickers through the establishment of partnerships and agreements between governmental agencies, cooperatives of waste pickers and not-for-profit organizations with relevant technical expertise.

A critique of and alternative to the current theoretical approach

Against this backdrop, inspired by and inspiring the political actions mentioned above, a growing body of scholars have turned their eyes towards waste pickers and, sharing the common goal of denouncing and mitigating their vulnerability through research, tackled a myriad of correlated topics adopting various theoretical and methodological frameworks. The bulk of the literature, however, revolves around two main topics: formalisation and cooperatisation. Acknowledging

the key public service waste pickers provide for municipalities, contributing to keeping streets clean and expanding the lifecycle of waste disposal facilities, as well as the need to duly remunerate them for this service, a large body of scholars, both in Brazil and elsewhere in the Global South, advocates for their formal integration into municipal waste management arrangements (see, for instance Gutberlet 2008; Magni and Günther 2014; Masood and Barlow 2013; Oguntoyinbo 2012; Oliveira Filho 2014; Oteng-Ababio, Melara Arguello, and Gabbay 2013; Velloso 2005). According to these scholars, such integration should be achieved through the establishment and strengthening of cooperatives of waste pickers, which should then be hired by local authorities for the provision of waste management services.

Although recognising the value of the course of action proposed by researchers who are aligned with the cooperatisation and formalisation scholarship – not least because I agree that waste pickers should be properly remunerated for the public service they provide – this thesis deviates from these proposals for two reasons: the legitimation of the exploitation of waste pickers that results from framing their empowerment in terms of cooperatisation, therefore shifting focus away from structural mechanisms which perpetuate poverty; and the portrayal of poverty as a residual condition associated with the informality of this occupation, which stems from their representation of the economy as dual, i.e. divided into a formal and an informal sector. My contention is that the end result of such an approach, wittingly or not, is an argument in favour of the maintenance of our current exclusionary and uneven development model.

This thesis takes a different stance. It is grounded in two premises drawn from the work of critical development theorists, which lead to a relational – rather

than a residual – approach to poverty. As Peet and Hartwick observe, "one of the great unmentioned facts about global income distribution is that poverty *results from* (i.e. is caused by) extreme inequalities" (2015:9 emphasis in original), which is my first premise. These authors further note, based on robust historical data, that "the growth of capitalism has generally produced greater income inequality over time" (2015:9); this is my second premise. Taken together, these propositions form a syllogism leading towards the conclusion that the growth of capitalism, which is the motor of our current global neoliberal development model, produces poverty. Hence, what is needed to address waste pickers' deprivation is not more of the same type of capitalist-based development, but rather a complete renovation of the way we conceptualise and pursue development.

Theoretically founded on the notion of adverse incorporation, which implies an admission that waste pickers are poor not because they are left out of the formal economy, but precisely because of the terms according to which they participate in it – in other words, they are adversely incorporated into the economy because their participation in it sustains their poverty – this thesis proposes to broaden the scope of analysis beyond the confines of cities, bringing the recycling economy into the spotlight. It refutes a dualist view of the economy and maintains that the so-called informal sector is indispensable to the process of profit generation in the formal sector, and that both are therefore interdependent. Since, as Esteva contends, the "economic colonization of the so-called informal sector", operated under the auspices of development, "involves launching the last and definitive assault against organized resistance to development and the economy" (2010:13), through this exploration of how the recycling economy is organised in Brazil, I ultimately intend

to discuss how development has become a tool to disempower the most vulnerable players in the market.

My interest in Brazil stems not only from the fact that it is my home country, and therefore elicits my keen interest; it is primarily associated with the fact that the cooperatisation and formalisation approach has found fertile terrain on which to flourish there, inspiring academics and policymakers alike. Indeed, this approach made its way from papers and dissertations into the National Waste Policy enacted in 2010, as mentioned previously. Furthermore, waste pickers in Brazil have achieved a level of organisation as a professional group which is perhaps not comparable to their counterparts in any other country. They are organised around a national movement, the *Movimento Nacional de Catadores de Materiais Recicláveis* (MNCR), which has a presence in all of the five regions of Brazil. Despite all this progress – and progress has indeed been made – waste pickers as a social group still experience high levels of poverty.

What does this thesis ask?

Fundamentally, this thesis is concerned with the causes of waste pickers' poverty. In light of the premises underpinning this study, regarding both the relationship between poverty and inequality and the adverse incorporation of waste pickers into the economy, this concern can be translated into three main research questions:

- How is the recycling economy organised in Brazil?
- Why does the recycling economy have this configuration?

- How is this configuration unfavourable to waste pickers, and in what ways?

The answers to these questions are complex and multifaceted. To make them more manageable, it was necessary to select a theoretical and methodological framework that can be used to conceptualise and research the relevant aspects of the recycling economy. This facilitated the analytical breaking down of these questions into narrower and more specific sub-questions.

Overview of the theoretical and methodological frameworks

Three key ideas provide the bedrock for the conceptualisation of the economy endorsed in this study: value, power and embeddedness. The economy is herein understood as a process of creating, enhancing and capturing value, which is fundamentally permeated by power relations and whose agents and structures are embedded both socially and territorially (Johns 2006). Theoretically grounded in the field of Cultural Political Economy, this thesis proposes to unravel this process using a four-part analytical scheme consisting of *a)* exchange relations between people (the political-economic dimension); *b)* people's multimodal channels of meaning-making (the semiotic dimension); *c)* that which is mobilised in the recycling process (the material dimension); and *d)* their medium of interaction (the spatio-temporal dimension). These concepts and dimensions allow for the formulation of more specific sub-questions, such as:

- Who are the actors who partake in the recycling economy? How do they relate to each other? What power dynamics are in place? How is value distributed among them?

- What processes of signification and meaningful communication structure the recycling economy? How do they affect the power of agents vis-à-vis one another and their capacity to capture value?
- How do the materials circulating in the recycling economy affect its organisation, power dynamics, and the process of value creation and capture?
- What spatio-temporal form does the recycling economy take? How do location, time, and distance intersect with value and power?

Amongst the four dimensions mentioned above, the material and spatio-temporal will be given lead roles in this study, recognized as they are – and as will be elaborated below – as underdeveloped areas in the Cultural Political Economy literature (Coe, Dicken, and Hess 2008; Hudson 2008). To that end, I will draw on authors who have engaged with the materiality of things, revealing the social relevance of their afterlives (see, for instance, Crang 2010; Gille 2010; Gregson et al. 2010; Hawkins 2009), as well as the work of scholars who remind us that space and time are co-implicated in social phenomena (see, for instance, Castree 2009; Harvey 2006a; Massey 2005; Reimer and Leslie 1999; Soja 2010).

The field of Cultural Political Economy studies is majorly concerned with combining "the analysis of sense- and meaning-making with the analysis of instituted economic and political relations and their social embedding" (Sum and Jessop 2013:1). Taking the inseparability of the economic and the social as an axiom (Peck 2013), this research field problematizes the economy both from the perspective of the institutionalisation of the accumulative logic of capitalism as a hegemonic global structuring order, with all the political implications that stem from this, mainly in

terms of the distribution of power and wealth – the *political* dimension – and from that of "the symbolic construction of social, political and economic processes" (Heur 2010:421), which implies that the economy "is 'put together' in various spatial and historical configurations" (Biebuyck and Meltzer 2017) – the *cultural* or *semiotic* dimension.

According to Hudson, however, the examination of the economy through the lens of Cultural Political Economy entails three dimensions: political-economic, semiotic and material. The political-economic dimension relates to labour processes and processes of value creation, exchange and realization, which are both constitutive of and constituted by circuits of social reproduction. The semiotic dimension comprises flows of knowledge and information and "the inter-subjective production of meaning and the social imaginaries, through which actors – individual and collective – experience and live their relations to the real world" (Belfrage and Hauf 2015:336). Finally, the material dimension refers to transformations and flows of energy, matter and materials, including both intended and unintended effects. Hudson does recognise that "it is important to emphasize the relations between these three registers [political-economic, semiotic and material] and the flows and spaces through which they are co-constituted and the inter-relationships among them" (2008:422–23). Nonetheless, he seems to regard space and time as a second-rank category, a background which is worth accounting for but not to the extent of regarding it as a dimension in the Cultural Political Economy framework he envisions. Due to a belief that such differentiation is unsubstantiated, since spatio-temporal processes are as key an element in moulding the structure and everyday practices of the economy as political-economic, material and semiotic processes, in

this study I have included relational space-time – understood as co-implicated with one another (Massey 2005) rather than separately as space *and* time – as a fourth dimension of analysis.

In order to empirically fulfil its promise to account for "social structures and processes on the macro level as well as institutional and organisational forms on the meso level" without losing sight of "agency and contingency on the micro level of the everyday" (Belfrage and Hauf 2015:336), Cultural Political Economy needs to be coupled with a heuristic framework that is attuned to the interplay between these scales. Like Hudson, I believe that the approach known as Global Production Network is an extremely powerful way of navigating through these scales, "bring[ing] together the 'system-world' and the 'life world', the imperatives of the accumulation process with the experienced realities of everyday life for people in varied sites of production, exchange and consumption" (2008:438), and therefore has great potential for methodologically exploring the economy in Cultural Political Economy terms.

Stemming from the World Systems tradition, the Global Production Network is one among a series of approaches that attempts to break through the complexity of the global economy and reflect upon its implications for the development of nations through an analysis of the "*social processes* involved in producing [distributing and consuming] goods and services and reproducing knowledge, capital and labour power" (Henderson et al. 2002:444 emphasis in original). It strives to "incorporate all kinds of network configuration", instead of only the linear structure commonly found in representations of the economy as a chain (e.g. a value/commodity chain), and to "encompass all relevant sets of actors

and relationships" (Coe et al. 2008:272) beyond simply concern with the governance of inter-firm transactions typical of other approaches originating from the same theoretical tradition. It therefore accounts not only for companies directly involved in the production process, but also for state and non-state actors who might influence the production process and its governance structure.

The Global Production Network approach provides researchers with a heuristic framework through which to examine the economy and the complex and multi-scalar governance mechanisms used by different actors to shape the flows of materials, capital, technology, and knowledge (Coe and Yeung 2015). Regardless of the entry point of empirical research, it "allows the researcher to 'follow-the-network' outwards from that starting point to reveal the complex interconnections and interdependencies between the wide variety of social actors that constitute global production networks and influence the processes of value creation, enhancement and capture therein" (Coe et al. 2008:290–91). Hence, it requires the use of methods that enable the researcher to "shift the focal point of analysis to different positions in the network" (Coe et al. 2008:277) as fieldwork proceeds, and as such demands a certain degree of open-endedness with regards to the geographical scope of the investigation.

Marcus' (1995) observations about the emergence of multi-sited ethnography are instructive in this respect. Noticing the transformations provoked by the development of the World Systems tradition in ethnographic research, Marcus contends that two avenues were open to researchers at that point. The first consisted of "preserv[ing] the intensively-focused-upon single site of ethnographic observation and participation while developing by other means and methods the world system

context", while the other "moves out from single sites and local situations of conventional ethnographic research designs to examine the circulation of cultural meanings, objects, and identities in diffuse time-space" (1995:96). In the operationalisation of the latter approach, the researcher would need to define an object of study to follow: a person, thing, biography, story, metaphor or conflict. This would then guide him/her through the "chains, paths, threads, conjunctions, or juxtapositions of locations in which the ethnographer establishes some form of literal, physical presence, with an explicit, posited logic of association or connection among sites that in fact defines the argument of the ethnography" (1995:105).

This thesis takes this second avenue identified by Marcus and, amongst the various elements that could be used as a compass to navigate the recycling economy – e.g. paper, cardboard, aluminium and other metals –, I chose to follow a thing: a PET (polyethylene terephthalate) bottle. This choice was made based on the omnipresence of plastics in our global society, as a token of our development model, which conveys their importance in the composition of waste pickers' income, given their abundance in waste streams. My journey started at *Lixão da Estrutural*, located in Brasília, the capital of Brazil, which was previously the biggest dumpsite in the country and one of the five largest in Latin America (ISWA 2016:4), before its closure in January 2018. From there, my research unfolded through seven months of fieldwork, between August 2016 and February 2017, as I followed the journey of PET bottles, using interviews and participant observation with waste pickers, brokers, wholesalers and recyclers as methods of data collection. This process culminates with the revaluation and transformation of discarded PET bottles into a new product, ready to re-enter the consumer market and start a new cycle.

Although this thesis is structured as a linear document, as a consequence of the adoption of the aforementioned 'follow-the-thing' approach as a research technique, intermingled among the chapters are reflections on my encounters and interactions with other nodes of the PET recycling network, e.g. representatives of a sectoral association and of governmental bodies, which – despite not being directly involved in the exchange relations – either influence its shape or help us understand the institutional environment.

Thesis outline

This thesis contains 12 chapters. Chapter 2 consists of a literature review, wherein the mainstream approach to the study of waste pickers' poverty, centred around the notions of cooperatisation and formalisation, is scrutinised and critiqued. Chapter 3 presents adverse incorporation as a theoretical point of departure and elaborates on the use of Cultural Political Economy as a theoretical framework, providing details about the four-dimensional analytical toolkit deployed in the thesis. Chapter 4 deals with the methodological implications accruing from my choice of theoretical framework. It discusses the value of using the Global Production Network approach as a heuristic frame and follow-the-thing as a research method in the application of this thesis' Cultural Political Economy informed analytical toolkit. Chapter 5 contains some considerations on research ethics and some reflections on positionality related to the process of entering the field. Chapters 6 to 11, the empirical-analytical part of the thesis, are organised in chronological order, according to the progression of fieldwork events. Each one corresponds to a node, i.e. an agent, in the recycling network, with the exception of Chapter 6, which is

structured around a place, i.e. *Lixão da Estrutural*. Every chapter starts with a brief discussion of the process of obtaining access, followed by an analytical engagement with empirical data intermingled with reflections on positionality. Finally, Chapter 12 presents the conclusions of the research.

2. LITERATURE REVIEW

The point of departure for this thesis was a dissatisfaction with the way the extant literature approaches waste pickers' empowerment. This chapter surveys this literature, placing emphasis on the branch of scholarship which became predominant, i.e. that which encourages the establishment of cooperatives and of partnership agreements between waste pickers and local authorities for the provision of waste management services. It then moves on to expose some of the flaws identified in this 'cooperatise and formalise' approach. First, the pitfalls of centring empowerment efforts around cooperatisation are presented, followed by a discussion of the implications of framing waste pickers' poverty in terms of informality, fundamentally grounded in a dualist view of the economy.

2.1. The promises of cooperatisation and formalisation

Inspired by – and inspiring – the political traction gained by waste pickers in Brazil since the 1990s, a growing body of scholars turned their eyes to waste pickers and, sharing the common goal of denouncing and mitigating their vulnerability through research, tackled a myriad of correlated topics, adopting various theoretical and methodological frameworks. The work of Silva, Lubarino and Souza (2010) and Santos et al. (2012) establishes a socioeconomic profile of waste pickers in different cities in Brazil in order to identify their most pressing needs. Having gathered similar data, Castilhos Junior et al. (2013) and Pinto and Carmo (2012) went a step further, making policy recommendations. The first aimed at assessing what type of vehicle and computer-based platforms would be most suitable to help waste pickers carry out

their work and plan collection routes more efficiently, while the latter intended to make a contribution to enhancing the socioeconomic and environmental impact of current policies. Rodrigues and Ichikawa (2015) use qualitative methods while Barboza and Zanella (2014) adopt visual methods to observe the daily routine of waste pickers and analyse how they perceive and are perceived by dwellers of the cities where they work and live. Others have contemplated the semantics of waste, as experienced by waste pickers, to problematize their self-perception (Oliveira, Fernandes, and Almeida 2012) and socioeconomic marginal position (Mota, Freitas, and França 2013; Santos and Silva 2011). In light of the conflicting forces of increasing public support for cooperatives and fiercer competition for waste from private recycling companies, Carmo and Oliveira (2010) problematize waste pickers' capacity to organise around collectives. Maciel et al. (2011) and Teixeira (2015) interview waste pickers to appraise their quality of life, perspectives and work conditions, while Alencar, Cardoso, and Antunes (2013), Gutberlet and Baeder (2008), and Zacarias and Bavaresco (2009) focus on aspects of their health.

The bulk of the literature, however, gravitates around two main topics: formalisation and cooperatisation. Acknowledging the key public service that waste pickers provide for municipalities, contributing to keeping streets clean and to expanding the lifecycle of waste disposal facilities, a large body of research has concentrated on advocating for their formal integration into municipal waste management arrangements, as a means of recognizing the crucial and yet neglected service they render to the city and duly remunerating them for that service. According to these scholars, such integration can be achieved through the establishment and strengthening of cooperatives of waste pickers, which would then

be hired by local authorities for the provision of waste management services (see, for instance Gutberlet 2008; Magni and Günther 2014; Oliveira Filho 2014; Velloso 2005).

Souza, Paula and Souza-Pinto (2012), Ribeiro et al. (2014) and Lange and Linzner (2013), for instance, have all collected and analysed data on the social, economic and environmental impact of the work of waste pickers to make the case that their integration into formal waste management arrangements would be beneficial for both waste pickers and local authorities. Other authors, like Dias (2012), have added nuance to this argument, contending that supporting waste pickers' organisations and integrating them into the system is a key element in a people-centred approach to development, while Gutberlet et al. (2017) advocate for their recognition as protagonists of a circular economy model.

Similarly, El-deir (2014), Jacobi and Besen (2011), Campos (2014), and Gutberlet (2015) discuss the opportunities and challenges arising from integrated solid waste management, arguing that it is the way forward to promote their socioeconomic inclusion and build cleaner cities, whilst reducing the costs incurred in managing waste. Baptista (2015) examines the legal framework for promoting integrated waste management in Brazil with the participation of waste pickers, aiming to identify bottlenecks in its implementation, and Rutkowski and Rutkowski (2015) analyse 25 cases of best practice, trying to identify processes that enable the replication of this integrative model.

Besen (2011) develops operational and socio-environmental parameters for the evaluation and monitoring of partnerships between local authorities and collectives of waste pickers for the provision of selective waste collection. Oliveira

Filho et al. (2006) measure the costs of equipping waste pickers associated with the National Movement of Waste Pickers (MNCR) with basic infrastructure to be able to work collectively and therefore enter the formal job market. Also favouring a quantitative approach, Lopes et al. (2015) use a mathematical model to propose a reverse logistics network as a strategy to integrate waste pickers and reduce the costs associated with waste management.

A similar trend can be observed in studies devoted to waste pickers in other countries in the Global South (see, for instance, Ezeah, Fazakerley, and Roberts 2013; Gutberlet 2015; Masood and Barlow 2013; Oguntoyinbo 2012; Oteng-Ababio 2012; Oteng-Ababio et al. 2013; Paul et al. 2012; Scheinberg 2012). Since the late 1970s waste pickers have been drawing attention from scholars all over the world, but the 2000s saw a surge of academic interest in them, which Gregson and Crang (2015:158) claim "coincides with growing concerns about a waste crisis in the Global South consequent on both urban expansion and increasing scales of consumption and new types of materials in consumer discards". Similarly to the situation in Brazil, the bulk of these studies stress the central and yet neglected role waste pickers play in waste management systems, emphasising the importance of their organisation around collectives and advocating for their recognition, remuneration and integration into the formal waste economy (see Gregson and Crang 2015 for a thorough literature review).

Ezeah, Fazakerley, and Roberts (2013), for instance, critically appraise the state of the informal recycling sector in developing and transitional countries and highlight the benefits of the integration of waste pickers into municipal solid waste management systems. Drawing on examples from Asia and Latin America, Medina

claims that authorities "do not realize fully the social, economic and environmental benefits of the recycling activities carried out by scavengers" and contends that cooperatives are "part of the solution to the seemingly intractable problem of collection and disposal of solid wastes" whilst promoting "grassroots development in an economically viable, socially desirable and environmentally sound manner" (Medina 2000:67–68).

After examining different types of alliances formed around solid waste management through case studies in India, the Philippines and Peru, Baud et al. conclude that partnerships including the informal sector "contribute more heavily to financial viability, employment, and cleaner urban neighbourhoods, as well as greater reuse and recycling of waste fractions" (Baud et al. 2001:3). Wilson et al. endorse this view, further positing that "there is clear potential for 'win-win' co-operation between the formal and informal sectors, as providing support to the informal sector to build recycling rates and to address some of the social issues could reduce the overall costs of waste management for the formal sector" (Wilson et al. 2009).

Cavé (2014) advocates for the integration of waste pickers into municipal solid waste management arrangements to protect them from market fluctuations, especially as raw materials get more expensive and urban waste mining increasingly becomes a strategy for accessing secondary raw materials. Nzeadibe (2009), Samson (2009), Scheinberg (2012), Scheinberg et al. (2011), Wilson, Velis, and Cheeseman (2006) and Velis et al. (2012) have all produced studies presenting similar arguments and inevitably converging on the same conclusion.

The global prominence given to cooperatisation and formalisation was most likely influenced by the publication, in 1996, of a working paper aimed at devising a conceptual framework for municipal solid waste management in low-income countries prepared under the auspices of a 10-year technical cooperation programme between the World Bank, the United Nations Human Settlements Programme (UNCHS) and the United Nations Development Programme (UNDP). The programme, designed to strengthen urban management in cities in the Global South, had regional offices in Africa, the Arab States, Asia and the Pacific, and Latin America and the Caribbean and produced a working paper series to disseminate best practices aimed at urban managers and policymakers at different government levels.

This particular 1996 working paper argues that "informal [waste] workers require organisational and technical support to promote their social rehabilitation and alleviate the unacceptable socio-economic condition in which they live and work" (Schübeler 1996:24), which it asserts should be pursued through the formation of collectives. Once organised, the paper states, "it is essential that the contribution of informal workers to MSWM [municipal solid waste management] be officially recognised and that their activities be integrated into the planning of municipal collection and resource recovery services" (Schübeler 1996:33), which they termed 'integrated solid waste management'. Given the influence that international financial institutions exert over policy agendas in developing countries, not least because the latter have an interest in conforming with the directives of the former in order to obtain funding, waste management being universally recognised as a pressing concern, it is likely that this conceptual framework has helped drive cooperatisation

and formalisation as a course of action attracting the interest of policymakers and academics alike.

2.2. Seeing the bigger picture

Despite their invaluable scientific and policy contribution, academic works advocating for cooperatisation and formalisation have been a target of criticism from scholars who doubt the capacity of such a course of action to deliver the promised socioeconomic improvement of waste pickers' circumstances. From a pragmatic vantage point, Marello and Helwege, for instance, argue that "efficient waste management is not labor intensive enough to absorb all or even a small share of the people who survive on trash scavenging" (2014:20), a claim that resonates with a contention made by Heliana Kátia, director of SLU-DF, the government agency in charge of managing municipal solid waste in Brasília, the capital of Brazil, whom I interviewed during fieldwork. For her, as for Marello and Helwege (2014), the realisation of a genuine vision of social inclusion should necessarily encompass efforts to equip waste pickers with the skills needed to afford them opportunities in other segments of the economy.

Although Marello and Helwege do recognise that "the process of inclusion is bumpy and one which hardly proceeds naturally as a consequence of cooperativization and solid waste modernization" (2014:2), their critique goes only as far as to challenge cooperatisation and formalisation initiatives for being overly ambitious in their goals. Other scholars make more thorough critiques of the extant literature on waste pickers' deprivation and argue that these initiatives contribute to waste pickers' exclusion as much as to their inclusion. Sternberg, for instance, asserts

that cooperatisation and formalisation are part of a multi-faceted political-economic agenda "compatible with the logic of the local neoliberal urban projects, focused on disciplining the city's physical and social landscape as new opportunities for growth and development continue to emerge" (2013:187). Still according to her, scholarship on the topic has focused on the provision of policy recommendations without ever considering the social, political and economic forces that propagate waste pickers' marginality and vulnerability (Sternberg 2013).

Turning their criticism to the foundations of some of the cooperatisation and formalisation literature affiliated with the Social and Solidarity Economy theoretical tradition, Gonçalves-Dias (2009) and Godoy (2009) challenge the conception of cooperatives as a revolutionary means to promote the social inclusion of waste pickers as an alternative to the capitalist mode of organisation. For Gonçalves-Dias and Godoy, waste pickers' cooperatives are subordinated to the market and immersed in a capitalist context determined by the accumulative logic to which they conform, consequently corrupting their central values. Again according to these authors, cooperatives merely legitimise waste pickers' instrumentalisation by powerful market agents through exchange relations, as well as by the government, given that local authorities usually require that waste pickers be organised into a collective in order to be hired for the provision of waste management services. For them, waste pickers are a fundamental part of the recycling economy – in their view a more appropriate analytical unit than the city – and constitute the initial link of an economic engine that creates and recreates exploitative relations and perpetuates their marginalisation. This point is also explored by Gutierrez and Zanin (2011), for whom the promotion of waste pickers' inclusion demands more than cooperatisation

and formalisation; it requires the strengthening of waste pickers' position in the recycling economy.

Although the arguments developed in this thesis support to a certain degree the critique made by Gonçalves-Dias and Godoy, I adopt a more nuanced – and perhaps more realistic – stance. My argument is that any form of economic organisation that presents an alternative to the capitalist logic will face contradictions and tensions in its attempts to coexist with the prevailing context of globalized capitalism in which it is embedded. This context, precisely because it is global, is inescapable. Even indigenous populations in the depths of the Amazon rainforest have not managed to isolate themselves from globalised capitalism – and one could question whether they would even wish to. Interactions between the clashing ideologies of solidarity, upon which cooperatives are based, and of accumulation, which underpins the capitalist project, will inevitably lead to some degree of compromise; if we are to envision a post-capitalist future, then we can only hope for the proliferation of these alternative modes of organisation.

Hudson's (2009) enquiry into the relations between forms of social economy and the mainstream economy, based on empirical research in the United Kingdom, is elucidative in considering the point I am trying to make. He reflects upon "the extent to which, and ways in which, the existence of a 'social economy' may be actually functional for mainstream capital accumulation rather than posing a radical challenge to it" (2009:495). Although he claims that this can only be assessed in practice, Hudson (2009:509) argues that it is very unlikely that social economy organisations will radically transform and displace "the (il)logic of capital accumulation (…) rather they provide at best an alternative to the mainstream, at

worst a safety net that serves to legitimize the inequalities inherent to the operation of mainstream capitalist markets". His final point, about the possible appropriation of the social economy discourse and toolkit to contain and diffuse challenges to the mainstream economic (il)logic, reinforces Sternberg's (2013) claim that cooperatives of waste pickers have been misused to push forward a neoliberal economic agenda, and correspond to what I think is the most valuable contribution made by Gonçalves-Dias (2009) and Godoy (2009).

Following the same line of thought, this thesis intends to expose the myopia of the cooperatisation and formalisation scholarship, with its nearly invariable choice of the city as the unit of analysis (Gregson and Crang 2015) – given that waste management is a standard attribute of local authorities almost everywhere around the world (Hoornweg and Bhada-Tata 2012:1) – and to problematize waste pickers' underprivileged position from a much broader perspective. Shedding light on the bigger picture, i.e. on waste pickers' active role in the recycling economy, I hope to demonstrate that the preference in the cooperatisation and formalisation literature for a local-level lens neglects that the scales used in research are imbued with politics (Latour 1996:370) and "may influence the discovery of pattern and process" (Easterling and Polsky 2004:66), sometimes helping to hide and sometimes to expose relations of domination and exploitation. Given that "urban life is nested within many different geographical contexts above and below the administrative space of the city itself" (Soja, 2010:32), this choice of geographical delimitation seems inconsistent with the depth of the forces which contribute to the continued socioeconomic marginalisation of waste pickers and may result in a narrow understanding of disempowerment processes.

2.3. Dismissing economic dualism

The possibility contemplated by Hudson (2009) of the social economy being misused to legitimise the perpetuation of the exploitative system it is intended to fight, which converges with Sternberg (2013), Gonçalves-Dias (2009) and Godoy's (2009) line of reasoning, seems ever more pertinent if we take into consideration that the cooperatisation and formalisation scholarship usually associates waste pickers' underprivileged socioeconomic situation with informality, where informal means "all those work situations characterized by the absence of (1) a clear separation between capital and labor; (2) a contractual relationship between both; and (3) a labor force that is paid wages and whose conditions of work and pay are legally regulated" (Portes and Sassen-Koob 1987:31). In other words, this scholarship designates the unregulated and non-contractual nature of waste pickers' work as the root cause of their vulnerable socioeconomic situation. In this section, I will present arguments to contest this interpretation, based on the rejection of a dualist view of the economy and of the independence of the so-called informal and formal sectors.

Bothered by the use of the formalisation discourse as a paradigm for theorising about and understanding the poor, Millar (2018) claims that it is grounded on a reductionist economic logic which focuses on what these people lack. She uses the informality discourse as the background for an ethnographic examination of "how life becomes livable through forms of labor commonly defined in terms of redundancy, abandonment, or exhaust" (Millar 2018:8) from the perspective of waste pickers working at *Jardim Gramacho*, a now closed dumpsite in the city of Rio de Janeiro which was the site of the documentary 'Wasteland'. Instead of

conceptualising waste picking as a survival strategy through a myopic economic lens, or as informal labour based on the hegemonic conflation of work with paid employment, Millar depicts it as a form of living within the conceptual frame she devised to denote not only a means of income, but equally a mode of being. In this way, she contests views of capitalist wage labor as emancipatory, presenting it rather as "a form of violence and technique of governance" for "forcibly reducing multiple subjectivities and modes of being in the world into just one – the predictable, governable subject of the worker" (Millar 2018:9), therefore supporting a deconstruction of the very idea of economy as a distinct domain of life, challenging the internal coherence and totalising force commonly ascribed to it. Millar trenchantly argues that "[i]f catadores are superfluous to capital accumulation", which is implicit in the assumption that they belong to an informal economy, "then it becomes impossible to ask how the materials they collect are tied into a 200-billion-dollar global recycling industry" (2018:8).

Similarly to Millar's argument, my contention is that the adoption of a dualist economic perspective, portraying poverty as "a 'residual' condition, i.e. as the exclusion from the formal economy – enables an argument in favour of the further expansion of the capitalist formal economy" (Phillips 2011:385), as if market forces were the antidote to poverty. A globally renowned example in the context of waste studies is Medina, for whom "the underlying factors that cause people to become scavengers are the poverty resulting from underdevelopment" (2000:67), which is premised on the assumption that what we need is more development and not a complete paradigm shift. Such an assumption however, seems contradictory to the approach taken by some within the cooperatisation and formalisation tradition who,

as Bosi (2008) notes and as discussed previously, present collectives of waste pickers as an alternative to the market economy and the capitalist logic of production, portraying cooperatives as a new expression of resistance and survival. One is therefore left to tautologically wonder: resistance to what, if the purpose of fomenting cooperatisation is precisely to facilitate the integration of waste pickers into the antagonised formal economy from which they are arguably excluded?

The economic dualism upon which the literature subscribing to the cooperatisation and formalisation approach is based seems to be connected to a narrow view of waste pickers' activity, as if it were constrained to waste collection, a public good in the economic sense (Cavé 2014; UN-Habitat 2010) which they usually provide for free. At the heart of this reductionist logic is an equally limited understanding of waste as rubbish, ignorant of the dual nature of waste as resource (Cavé 2014). As Gregson and Crang correctly put it, "[p]redominantly, social science work identifies waste in terms of waste management; a move which ensures that waste is defined by, and discussed in terms of, 'disposal' technologies, or – more correctly – waste treatments, and their connection to policy" (2010:1026). The consequence is the production of studies that are oblivious to the pivotal role waste pickers play in a thriving recycling economy as reclaimers and sellers of recyclables. This recycling economy is an economy of which they are undeniably already a part, therefore evincing the inconsistency of the formalisation argument.

Dismissing such a dual view of the economy, the fieldwork in this thesis demonstrates that the adoption of this residual approach to poverty overlooks the existence of a structural connection of subordination between the informal and formal economies, and the power relations entangled in the process of integration

(Phillips 2011; Phillips and Sakamoto 2012; Du Toit 2009). Neither marginal nor peripheral, the informal sector is so tightly interwoven with the formal sector that it does not make sense to conceptualise them as distinct; they are inseparable parts of the same system. What we observe is "a process in which the latter [formal sector] relies on and feeds on the former [informal sector] to increase profit" (Phillips 2011:384), therefore generating rather than curtailing informality and producing poverty. In fact, much of the expansion and profits generated by the formal economy have their roots in the "savings from tax and social security obligations that gives these [informal] enterprises their principal competitive advantage" (Portes and Sassen-Koob 1987:32).

Gonçalves-Dias' (2009) work is illustrative on this point, having served as an inspiration for this thesis. Based on a case study of two networks of cooperatives located in the southeast of Brazil, she suggests that the process of waste pickers' incorporation into the PET (polyethylene terephthalate) recycling market in Brazil has its roots in the industry's need for cheap labour to collect and sort recyclables in order to be profitable, given that its prices are indirectly determined by the global market for virgin PET, and the existence of a mass of unemployed and unskilled workers seeking to provide for the needs of their families. According to her, this dynamic of capital accumulation, not informality, is what triggers the ambiguous process of exclusion, inclusion and precarisation of waste pickers' jobs that results in their lives being permeated by vulnerability (Gonçalves-Dias 2009). Consequently, framing poverty in terms of being left out and assuming that integration is an inherently positive process may deflect attention from the root causes of these workers' socioeconomic deprivation, thus unintentionally helping to perpetuate it.

In proposing this view, I am not dismissing the value of research on cooperatisation and formalisation; neither am I denying the positive impact these processes can have on the lives of waste pickers, not least because of the more pragmatic tone taken in these studies. However, it is necessary to acknowledge that through their focus on self-reformation – whereby waste pickers are made responsible for improving their own condition – and on local level interventions, this scholarship leaves unaccounted for a series of multi-scalar processes that are entangled with waste pickers' poverty. Hence, it goes only as far as alleviating poverty, i.e. "*reducing the incidence of poverty via individual processes of graduation and successful incorporation into existing social arrangements and patterns of distribution*" (Wood 2003:462, emphasis in original).

The danger is that by defining poverty as a market failure problem which is amenable to market interventions – in this case the incorporation of waste pickers into the formal economy – the cooperatisation and formalisation scholarship renders certain courses of action plausible while excluding others. Since "the analytical categories used carry with them discursive power in their own right" (Dicken et al. 2001:90), it is the intention of this thesis to draw upon an alternative theoretical framework that recognises waste pickers' role in the so-called formal recycling economy, so as to open up the way for the design of poverty eradication measures that "*rel[y] upon the principle of structural change, and [are] about cohorts of the poor confronting power and inequality*" (Wood 2003:462, emphasis in original).

When societies and markets are built upon an extremely unequal distribution of resources, as is the case in Brazil, which has a GINI coefficient of 51.5 (UNDP 2016), corrective policies intended to expand the opportunities of

underprivileged groups – through the establishment of cooperatives and the formalization of their work, for instance – can be nullified by the perpetuation of broader inequitable political and economic relations, a factor which is analytically central to this thesis. Precisely due to the entanglement between political and economic processes, the expectation that capitalist development will result in the absorption of an informal sector, supposedly left out, into a growing global market, and that this will subsequently lead to the socioeconomic advancement of waste pickers is unrealistic and fundamentally distorted. On the contrary, in fact, evidence suggests that the "informal economy is 'here to stay' and expanding with modern, industrial growth" (Chen 2007:5; see also Meagher and Lindell 2013), which is an indication that it no longer makes sense to define precarious work in terms of lack of regulatory coverage. In fact, according to Slavnic (2010), informalisation results from a structural conflict between old regulatory frameworks based on the ideal of a welfare state which is protective of labour rights and the prevailing neoliberal regime of capital accumulation.

Accentuation of the asymmetry of work relations to accommodate the further growth of big corporations is evidence of the mutual interdependence between poverty-related vulnerabilities and work-related insecurities, and suggests that the globalization of the capitalist system – in its various forms – is the structural cause of work precariousness, rather than informality (Meagher, Mann, and Bolt 2016; Siegmann and Schiphorst 2016). From this angle, unless we have "a greater preoccupation with the symptoms than with the causes of urban poverty" (Santos 1979:4), it does not make sense to conceptualise waste pickers' activity as exogenous to the formal economy, since it is clear that they are already an integral part of it.

Consequently, in order to articulate solutions to truly improve waste pickers' livelihoods and lift them out of poverty, one should look for alternative approaches that are premised on the active role they play in the formal economy, and thereby transcend the theoretical dualism and methodological limitations of the cooperatisation and formalisation literature. On this basis, the following chapter delineates the approach proposed in this thesis.

3. THEORETICAL FRAMEWORK

Dismissing the economic dualism upon which the cooperatisation and formalisation scholarship is based, this chapter begins to present adverse incorporation as the pillar of an alternative theoretical approach that problematizes poverty from a relational, as opposed to a residual, angle. This results in a portrayal of waste pickers as key agents of a thriving recycling economy – instead of as workers left out of the formal economy. Following this, Cultural Political Economy is introduced as the theoretical framework that structures this thesis, with a dissection and explanation of its four dimensions as adopted and elaborated upon in this thesis.

3.1. Adverse incorporation as the foundation of an alternative approach

The formalisation and cooperatisation scholarship aligns itself – perhaps inadvertently – with the worldview advanced by proponents of the controversial modernisation theory. The latter endorse a representation of the world as consisting of "a number of related but basically autonomous 'societies'" moving along uniform and "parallel lines of development in a quadrant having level of development for its y-axis and historical time for its x-axis" (cf. Hopkins and Wallerstein 1977:111). Through the state-centric lens of this modernisation framework, grounded in the classical economic postulates of Adam Smith, social imbalances such as poverty can only be overcome once traditional forms of societal organisation and artisanal modes of production – such as that of waste pickers – have evolved to and caught up with more modern practices – with formalisation certainly fitting the criteria for classification as such a practice. Mirroring the trajectory of the so-called 'developed

countries' would trigger "a virtuous circle wherein specialisation induced greater productivity, higher national income, and, therein, the further enlargement of the market" (Taylor 2007:531). It is beyond the scope of this study to demonstrate the numerous fallacies underpinning this worldview, which is ethnocentric to say the least; it suffices to note that it privileges a uniform and linear perspective of history and, in so doing, diverts attention from the root causes of poverty.

Contesting such a paradigm and building on the work of 'dependentistas' such as Raúl Prebisch, the emergence of a new theoretical tradition took place, initiated by Hopkins and Wallerstein, who proposed a shift in focus away from societies in the abstract, turning instead to the world as "a spatio-temporal whole, whose spatial scope is coextensive with the elementary division of labor among its constituent regions or parts" into "'cores' and 'peripheries' united and reproduced through processes of capital accumulation and unequal exchange" (1977:112). The underlying premise of the World-Systems school of thought is that "[c]ore-cum-periphery and periphery-cum-core form and develop always and only in relation to one another, by definition" (Hopkins and Wallerstein 1977:116), which in fact seems to be what critics of the formalisation approach have hinted at, in more concrete terms, when arguing that the so-called informal economy is in fact fully articulated with the formal economy and is also integral to the process of capital accumulation (Bosi 2008). For authors affiliated with this tradition, the supposed gains triggered by modernisation in a general sense, and by formalisation more practically, are "closely tied to uneven development, vast inequalities, and the poverty of an expanding global working class" as "proletarianisation accelerates apace through dispossession and primitive accumulation" (Taylor 2007:531).

Influenced by this school of thought, this thesis dismisses "interpretations of social exclusion [which] sometimes assume that the ways in which markets work are in themselves in principle unproblematic", and joins critical development thinkers in arguing that "the *normal* operations of markets and economic institutions can in themselves create or worsen poverty" (Hickey and du Toit 2007:13–14). Markets, after all, are not neutral points of equilibrium between independent agents, but rather social structures with imperative non-economic dimensions (Granovetter 1985). Market agents engage in strategic social negotiations, creating hierarchies and agreements to shape the institutional environment in an attempt to stabilize conflicts, minimize competition and appropriate more value. As a socially embedded phenomenon, markets are influenced not only by economic interests but also by the dynamics of social relations.

This is particularly clear from Gill's political economy-informed study of the exchange relations between two groups of workers in the informal waste sector in India, i.e. waste pickers and itinerant buyers, and their respective dealers, i.e. *panni* and *kabaddi*. Equally premised on the intrinsic nature of the informal economy to market exchanges and the process of capital accumulation, Gill (2010) turns to the wider social and political institutional context of the plastics recycling market in India in search of the elements that may help to elucidate the causes of income poverty and the multidimensional deprivation of waste pickers and itinerant buyers. She notes that their belonging to different social groups means that they have different types of access to household waste streams, thus yielding very different returns. While waste pickers deal with unsegregated waste, "only some of which is

recyclable", itinerant buyers deal with "dry, segregated, inorganic waste, some of which is reusable and all of which is recyclable" (Gill 2010:88).

In light of the social context these workers inhabit, Gill refutes what she designates as the "unsubstantiated conclusion" that "waste pickers are economically exploited or oppressed in some sense by the dealers to whom they sell waste and *by them alone*" (Gill 2010:24, emphasis added). She sustains that only an approach that privileges the social context and the origins of the power structure underpinning the set of vertical and interlinked exchange relations from the bottom to the apex of the value chain that constitutes the recycling economy is able to explain the degree to which exogenous factors constrain the ability of parties to act, particularly in what concerns waste pickers' socioeconomic immobility. A vigorously asserted and socially institutionalised differentiation between the castes of waste pickers and *panni* dealers on the one hand, and itinerant buyers and *kabadi* on the other, means that the former are subject to a broader level of deprivation and exclusion (Gill 2010). Based on these findings, Gill asserts the "complicity of society at large in the on-going exploitation of scavengers, which is commonly and wrongly attributed to the power wielded by a single panni dealer" (Gill 2010:116).

India certainly has its own unique social dynamics, with the caste system playing a considerable role in institutionalizing the lower social ranking of individuals who hold occupations categorized as unclean, such as waste workers. Still, Gill's observations are enlightening and point to the need to avoid approaches that "overestimate the individual's role in and underestimate the socially constructed nature of these exchange relations (…) neglecting issues about the origin of power, that is, the social origin of the opportunity sets facing each party to the transaction, in

the relationship" (Gill 2010:114). Not least, Gill disavows views of the economy as an autonomous domain of life from which waste pickers are excluded, which indicates that to understand waste pickers' socioeconomically deprived position, we need to shift our focus away from "a condition of socioeconomic exclusion as the principal determinant of poverty and marginalization" (Phillips 2011:390) and to reframe it around the political economy of recycling markets, which is the perspective adopted in this thesis. This, in turn, suggests that "the challenge is much more daunting", since the poor "include many of those who have actively participated in the process of global integration" (Kaplinsky 2000:118).

In his analysis of what he designates as the "myth of win-win scenarios", put forward by the World Bank to support the integration of small farmers in global agribusiness, which is applicable to the present study by analogy, given the commonalities between the formalisation and integration discourses, Oya (2009) advances a similar argument. He asserts that the problem with such win-win scenarios "is not simply that the integration of several millions of resource-poor small farmers in global agribusiness chains is fantasy" (2009:598). Rather, according to him, the problem lies in their tendency to "neglect, silence, or misrepresent power struggles and unequal and conflictual relations, which are (…) clearly intrinsic to the structure of relations of production and surplus extraction in contemporary capitalism" (Oya 2009:598). For him, the attempt to reconcile a "pro-market capitalist stance" with a "pro-small farmer bias" equates to "squaring the circle" (Oya 2009:597). Hence, what the World Bank portrays as win-win scenarios could be more realistically interpreted as win-lose scenarios, with it being perfectly clear who the losers are. It is worth recalling that the same World Bank that proposes such

'win-win scenarios' has promoted the formalisation of waste pickers in its waste management agenda since the 1990s.

Scholars who share a similar view of the economy as a product of social interactions that constrain and enable particular courses of action (Mutch 2002), and who are equally concerned with the structural factors behind chronic poverty, i.e. that experienced by individuals over long periods of time (Bolwig et al. 2010), draw attention to the fact that workers can be part of the formal economy without actually enjoying the benefits supposedly associated with such inclusion. They describe this process as 'adverse incorporation' (see, for instance, Meagher et al. 2016; Phillips and Sakamoto 2012; Ponte 2008), a concept which helps in further elucidating my argument, since it offers a clear lens through which we can survey the participation of the poor in the economy, placing "a shared emphasis on structure *and* agency, and their inter-relations" (Hickey and du Toit 2007:4).

This view implies the framing of poverty from a relational rather than a residual angle in order to capture how poor people, in devising strategies to manage their vulnerability and ensure some security and stability of income, might invest in social, political and economic relations across both time and space which provide for their immediate and more practical needs, but simultaneously endanger the attainment of more strategic and longer-term goals, creating a vicious cycle of dependency (Hickey and du Toit 2007), a phenomenon Wood (2003) describes as a Faustian bargain. Due to the uncertainty that permeates their daily lives, the poor privilege the present and disregard the future, which may lead to entering into hierarchical relations that reproduce inequality between the parties (Wood 2003).

McCarthy (2010), for instance, surveys the terms of smallholders' engagement with agribusiness in Sumatra, Indonesia, in light of a process of rapid agrarian change triggered by the emergence of oil palm as a commodity. This process, according to him, is marked by patterns of inclusion/exclusion and adverse incorporation and has altered the distribution of social power in rural communities, mostly through shifts in land ownership, to the detriment of the poor. Smallholders' engagement with globalised agriculture is shaped by the monopolistic power of transnational corporations, who delineate a predatory market environment that constrains the choices of participating farmers, and which needs to be reconstituted if commodity chains are to function without exacerbating chronic poverty (McCarthy 2010). Bracking (2003) observes a similar dynamic in her review of cases of agricultural systems undergoing modernisation, mostly in sub-Saharan Africa. Through this modernisation process, multinational agro-industrial companies appropriate those aspects of production which are most profitable, such as the provision of inputs, processing, distribution and retailing, leaving the most risky and least profitable activities – i.e. growing the crop – to the poor smallholder (Bracking 2003).

Phillips has also made prolific use of the adverse incorporation framework to examine forms of slave labour in the bovine cattle sector in Brazil (Phillips and Sakamoto 2012), comparing this with unfree labour in the garment sector in India (Phillips 2013) and contending that forms of slave labour arise "through the circular interaction between, on the one hand, the functioning of the global productive economy and associated labour markets, and, on the other, the social relations of poverty which give rise to vulnerability" (2013:171). Mezzadri has equally included

adverse incorporation in her toolkit to make a class- and gender-informed analysis of the Indian garment industry and its complex sweatshop regime, "where women may be incorporated in 'adverse' ways, marginalised or excluded, while always remaining central to the process of value generation" (2016:1886).

Joining this theoretical tradition, I argue that waste pickers are not in fact left out of the formal economy, but are rather adversely incorporated to it in a way that fulfils their most immediate needs at the expense of creating dependency ties and compromising long-term goals such as breaking the poverty cycle (Hickey and du Toit 2007). This dynamic of adverse incorporation is not so clearly observable in the extant literature due to its focus on waste pickers' role in municipal waste management systems, therefore overshadowing their active participation in broader regional, national and even global recycling economies. For this reason, I propose to shift attention to the recycling economy, using the analytical toolkit described in subsection 3.2 to explore and expose the inequalities and asymmetries which I assume are inscribed in its structure and which imply, based on the premises set out previously, that the mere integration of waste pickers into waste management systems does not guarantee their socioeconomic emancipation, since the broader economy – of which they are already a part, as crucial enablers of the process of capital accumulation (Bosi 2008) – is inequitable by default.

The adoption of adverse incorporation as a theoretical premise, however, subjects this thesis to at least one easily foreseeable criticism: why would waste pickers – or for that matter, anyone – agree to being incorporated into the economy on such adverse terms? The most obvious answer would be that for some – for the most deprived – there is no alternative. Acquiescing is the only option available to

them in order to survive. Another way of seeing it and, in fact, the way this thesis chooses to approach it, is through Lukes' (2005) conception of power which was invoked earlier. Through what he designates as power's third dimension, Lukes speaks of how "people's wants may themselves be a product of a system which works against their interests" (2005:37–38) so that power may take on its most effective and insidious form precisely in the instances when it "avert[s] both conflict and grievance through the securing of consent" (2005:111). In other words, the agreement of those adversely incorporated may be obtained by deforming their preferences, "by instilling and sustaining misleading or illusory ideas of what is 'natural' and what sort of life their distinctive 'nature' dictates, and, in general by stunting or blunting their capacity for rational judgment" (Lukes 2005:115). This process of naturalising the condition of the adversely incorporated may happen in myriad ways, but fundamentally it involves enforcing belief in the inevitability of the system, i.e. that there is no realistic alternative to being adversely incorporated, and/or that being adversely incorporated is in the individual's best interest, somehow concealing its adverse effects, which Scott (1990) refers to respectively as 'thin' and 'thick' versions of false consciousness.

Although this may sound patronising if taken at face value, what it really implies is that "everyone is susceptible to such failures [of rationality], that one can be schooled, and school oneself, to avoid them but that others are able, indeed these days employ entire phalanxes of skilled professionals, experts in communication and public relations, to benefit from their continuance" (Lukes 2005:116). In fact, from the perspective adopted in this thesis, the very approach taken by most scholars researching waste pickers' empowerment is arguably an instance of failure of

rationality, since it puts forward a plan of action – i.e. cooperatise and formalise – believing it to be in waste pickers' best interests when, in fact, they are unintentionally privileging the interests of more powerful players, detracting attention from the root causes of waste pickers' poverty.

I should clarify that I am not opposed to the ultimate aim pursued by scholars who advocate for cooperatisation and formalisation, i.e. to properly remunerate waste pickers for the public service they currently provide for free in most cities. Quite to the contrary in fact, I believe this goal should indeed be pursued as a social justice measure of the highest priority. My concern is that the narrative used to justify this course of action may be contributing to the concealment of other more fundamental factors associated with waste pickers' underprivileged socioeconomic position and which may be crucial in the process of empowering them. In particular, the cooperatisation and formalisation approach places too much emphasis on the role that waste pickers themselves should play in improving their situation – organising around cooperatives – and on what local authorities should do to support that – formalising their work – neglecting the fact that waste pickers are a central cog in the recycling economy machine, about which we still know very little.

Another criticism frequently directed at the adverse incorporation scholarship concerns the arguably intuitive and "linear understandings of labour vulnerability premised on the 'placement' of workers along a vertical employment ladder shaped by the global chain and/or network" (Mezzadri and Lulu 2018:1035). Although for those departing from the premise that the economy is not dual it may seem obvious that the cause of workers' poverty is not their exclusion from the so-called formal economy, but rather their participation in and instrumentalisation by it,

this does not dismiss the value of the adverse incorporation scholarship. Adverse incorporation serves as a theoretical premise just as the duality of the economy serves as a premise for the cooperatisation and formalisation scholarship, providing the ontological basis upon which researchers may seek to unveil and understand the mechanisms which engender poverty based on the epistemological frame of their choice – this is precisely the aim of this research.

3.2. The four dimensions of a Cultural Political Economy perspective

The choice to problematize waste pickers' underprivileged socioeconomic condition from the perspective of their active participation in the recycling economy raises one preliminary question: how should one conceptualise the economy? Fundamentally, the conceptualisation of the economy proposed in this thesis is anchored in the notions of value, power and embeddedness. At its most basic, the economy entails "circuits of production, circulation, realization, appropriation and distribution of value" (Hudson 2004:448), which under capitalism are intended not only to secure subsistence, but also to serve an accumulative logic. Hence, value is in fact "surplus value that is created through a production process converting labour power into products and services to be exchanged for more than the labour value embedded in those commodities", as well as "various forms of economic rent that can be realized through market as well as non-market transactions" (Coe and Yeung 2015:16).

Since "goods do not possess a value *a priori*", at the core of the economy are exchange relations that presuppose processes of valuation, which in turn are "deeply rooted in the expression and preservation of particular interests" (Çalişkan and

Callon 2009:386–89). However, not all economic agents are endowed with the same value calculating competencies or with the same capacity to enforce such valuations and capture value, giving rise to asymmetrical relationships that privilege the interests of the powerful. This equates to saying that the economy is permeated by power relations, as all social relations inevitably are, where power stands for the capacity of "human agents, separately or together, in groups or organisations, through action or inaction, [to] significantly affec[t] the thoughts or actions of others (specifically, in a manner contrary to their interests)" (Lukes 2005:56–57). This contention is premised on the embeddedness of the economy within social and political arrangements, and therefore on its subjection to spatio-temporal frames.

These three notions – i.e. value, power and embeddedness – intersect and mutually influence one another, and the end result of such interactions is the economy. Each of these building blocks of the economy, however, is subject to broader and intersecting processes that affect and shape society as a whole in its multiple forms of organisation and in the pursuit of different goals, not only economic ones. This thesis adopts Cultural Political Economy theory as a lens through which to examine the recycling economy and, therefore, focuses on four such processes or dimensions: political, semiotic, material and spatio-temporal. In this section, I will delineate the contours of this theoretical framework and, in so doing, will dissect the analytical toolkit deployed herein while concomitantly evincing some of the assumptions upon which my thesis is grounded.

The political dimension:

As an initial point, I should note that I refute formalist conceptualisations of the economy as independent from social relations and institutions and moved by self-interested and rational human beings constantly attempting to maximise utility. However, I equally disapprove of substantivist views of the economy as socially determined, which implies "reduc[ing] agents and actions to passive bearers of self-reproducing, self-transforming social structures" (Jessop 2010:339). These under- and over-socialised approaches (Granovetter 1985) are grounded in a mechanistic and reductionist conception of structure and agency (Harvey 2006b), and upon the privilege of one over another, which I refute. Rather, I prefer to think of structure and agency in a dialectical way which is described in the sociological literature as structuration: "a complex, contingent, tendential process that is mediated through action but produces results that no actors can be said to have willed" (Sum and Jessop 2013:150). This opens up the possibility of "examining how a given structure", understood as the end result of various structuration attempts, "may privilege some actors, (…) some actions over others; and the ways, if any, in which actors (individual and/or collective) take account of this differential privileging through 'strategic-context' analysis when choosing a course of action." (Sum and Jessop 2013:49).

The recognition that agency and structure are mutually shaped, though, comes with a caveat. As Hudson contends, agents' attempts at challenging the structure "are typically folded into and absorbed in ways that alter, but do not radically break and transform, the defining structural characteristics and boundary conditions defined by capitalist social relations" (2004:451), which implies that such

rupture and radical transformation may not eventually happen. What is key here is that some attempts at challenging "the compossible combination of relations among relations within specific time-space envelopes" are more likely to succeed than others, since structure-building is "a contingently necessary outcome of the asymmetrical interaction of competing structuration attempts" (Sum and Jessop 2013:4–6). The political dimension of the economy sheds light on these socially reproduced compossibilities and asymmetries in attempts at structuration, as well as their effects on the processes of value creation and appropriation, the power dynamics between agents and their societal embeddedness.

The semiotic dimension:

If we are to approach structure and agency relationally, as proposed, then economic action can only be understood "in terms of (differentially reflexive) structurally oriented strategic calculation" embedded within social structures which are, in their turn, inscribed by "strategic selectivities and actions" (Sum and Jessop 2013:49). Both the strategic calculations effected by agents and the strategic selectivities inscribed in structures "emerg[e] from the contingent co-evolution of semiotic and extra-semiotic processes (…) that together shape the variation, selection, and retention of particular imaginaries in a continuing dialectic of path-dependent path-shaping" (Jessop 2010:340). Structure and agency, therefore, are not only co-constituted, but are equally moulded by semiotic and extra-semiotic processes. I shall proceed to analyse the importance of semiotic processes to our understanding of the economy.

Preliminarily, it is worth clarifying that by semiotic processes I am referring to "the 'sense meaning' involved in the apprehension (e.g. cognitive, normative or appreciative significance) of the world and which, when translated into intersubjective meaning-making, has important intertextual, contextual and pragmatic aspects" (Sum and Jessop 2013:4). Semiotic processes are a key force in organising, stabilising and giving coherence to the chaos and complexity of the economy by transforming it into a narrated imaginary comprised of a selective – and therefore inherently political (which interests will be represented in such selection?) – representation of all economic activity (Heur 2010:431). "An imaginary provides one entry-point (among many others) into a super-complex reality and can be associated with different standpoints, which frame *and contain* debates, policy discussions and conflicts over particular ideal and material interests" (Sum and Jessop 2013:165 emphasis in original).

Because imaginaries usually enjoy a certain stability across time and influence the contours of new imaginaries which may eventually emerge, giving rise to a dialectic of path-shaping and path-dependency, Sum and Jessop argue that they have a key role in the "reproduction and transformation of the prevailing structures of exploitation and domination" (2013:165). This can be more clearly grasped in concrete terms. For an exchange to take place, meaning must be ascribed to goods as a precondition for the goods being valued by customers and then sold (Hudson 2008). However, as stated earlier, processes of valuation are inherently linked with certain individuals' or groups' interests – and hence power – and these "do not exist independently of the discursive constitution of particular subject positions", which implies that "semiosis is (…) constitutive in securing the conditions for

accumulation" (Sum and Jessop 2013:183–87), besides being contingent upon space and time horizons. The semiotic dimension is concerned with such meanings, discourse and imaginaries, which permeate and shape the economy.

Advertisers' and multinational companies' attempts at creating "'world cultural convergence', to homogenize consumer tastes and engineer a 'convergence of lifestyle, culture and behaviours among consumer segments across the world'" (Hudson 2008:429) in order to enable mass production does not disprove the aforementioned cultural constitution of the economy; rather, it confirms it through the increasing prominence given to semiosis at the expense of facts. The emphasis placed by producers on the symbolic connotations of commodities is a strategic part of the process of endowing them with different meanings according to the socio-spatial-temporal frame of sales (Hudson 2008), therefore adapting the same thing, at a semiotic level, to please different tastes. To the extent that economic relations are intrinsically social, and since all social relations have a semiotic component, which guides "a critical mass of self-confirming actions premised on [the] validity" of "specific meaning systems" (Jessop 2010:338), it follows that the economy cannot be fully grasped without an appreciation of its semiotic dimension.

The material dimension:

Although the political and semiotic aspects presented above constitute the fundamental elements of a Cultural Political Economy approach (there are a variety of nuances within this theoretical tradition), I second Hudson (2008:433) in affirming that the economy has a material dimension which should be accounted for and included as a core element of an analysis informed by Cultural Political Economy,

"not least as it may well have implications for our understanding of processes of value creation and the creation of meanings". In other words, the natural world imposes certain constraints and potentialities on what is semiotically and structurally possible within the economy (Sum and Jessop 2013), an aspect which has so far received little consideration, but which perhaps becomes more pronounced when we confront the economy from the perspective of end-of-life goods, as I intend to argue.

The transformations and flows of energy, matter and materials – with both intended and unintended effects – which take place as goods are produced are often not acknowledged by the academic literature which fails "to connect the processes of production, distribution and consumption to the natural environment in which they are fundamentally grounded" (Coe et al. 2008:278). At an empirical level, this omission implies a disregard for the environmental stresses associated with production and consumption through the extraction of resources and the disposal of waste, for instance. At an ontological level, it presumes a dichotomised view of the social and natural worlds, as if humans were uniquely active, and matter inescapably passive (Rudy and Gareau 2005). Nonetheless, production is essentially a process of material transformation through the re-organization of matter and energy (Bridge 2008) and, as such, is constrained by certain natural laws and material affordances which both enable and limit social interaction (Urry 2000). More than passive, subservient objects or simple effects of human actions, commodities circulating in the economy merit attention in and of themselves, based on their constitutive – and not merely instrumental – force over human affairs, conditioning the political organisation of markets despite the prevailing anthropocentric claims of social and political theory (Whatmore and Braun 2010).

The interweaving between the human and physical worlds has led some social scientists, Latour being among the most prominent, to negate the existence of a "distinct domain of reality to which the label 'social' or 'society' could be attributed" (Latour 2005:4). The social world is made out of both social and non-social associations between entities which are both human and non-human (Latour 1996:369), hence making it impossible for society and nature, or humans and objects, to be analysed separately (Urry 2000). Exchanges between the so-called social and material realms flow in both directions (Murdoch 1997), creating a relationship of mutual contingency: "social relations are constituted in and through things" (Kirsch 2013). Goods circulating in the economy are both products and producers of social – or should we say socio-material – relations; they have social lives (Appadurai 1986:3). Accordingly, without taking their materiality into account one cannot fully apprehend the dynamics of value creation and appropriation which underpin the economy.

Nonetheless, conceding that "nonhumans exist along side [sic] us and connect us in time and space" (Murdoch 1997:329), i.e. that they are integrated into the social fabric, as Latour (2005) argues, does not necessarily imply that they have the same ontological status as humans, i.e. that there is a flat ontology between humans and nonhumans (Kirsch 2013). Humans' embodied emotional nature and unique consciousness and intent create an ontological asymmetry from nonhumans (Fine 2005; Mutch 2002). "Nature provides limits to what is corporeally possible but it does not determine the particular actions that humans may engage in" (Urry 2000:204). Such asymmetry, however, under no circumstance equates to an ontological superiority over other beings or things (Bennett 2010a), as if the

combination of rational action and science and technology could fully realize human and social intentions and mould nature to our liking (Gille 2010). The deleterious consequences of such groundless reasoning are evident in the numerous imbalances we have created in our environment.

The existence of this asymmetry cannot, in any case, be interpreted as passivity. That is why, despite conceding that Çalişkan and Callon (2010) are right to affirm that only humans have agency – since the term in its sociological denotation is entangled with the notion of intent which non-humans lack – I contest their claim that "it is the passivity of things that transforms them into goods, and that enables agencies to form expectations, make plans, stabilize their preferences and undertake calculations" (2010:5). Things might not have agency, according to the narrow sociological understanding of the term, but this does not equate to saying that they are entirely passive, and the authors themselves seem to acknowledge that. According to Çalişkan and Callon, "[m]ateriality clearly does not determine the regime of value (such as whether an object is a gift or a commodity) into which an object will fall, but it nevertheless exercises a number of constraints" (2010:388). These constraints might not be technically classified as manifestations of agency, for they lack intentionality, but they do prove that things are endowed with what Bennett designates as "thing-power" (2010a) or "the capacity to assert themselves" through "their anterior physicality, their free or aleatory movements" (Hawkins 2011b:548), or in other words, a form of post-modern non-anthropomorphic agency.

This vitality possessed by things is hard to ignore once we turn our gaze to end-of-life products, in relation to which the so-called "pacification is difficult to accomplish (…) because things and materials become animated in these activities

[recycling and recovery], making multiple suggestions as to what they might be, or become" (Gregson, Watkins, and Calestani 2013:8). The prior existence of things which are subject to recycling means that their power and the capacity to shape and delimit their transformation process, as an agglomerate of pieces and different materials over which there is no quality control, is a lot more pronounced than at the time when they were initially manufactured (Gregson et al. 2013). "The particular (bio)chemical and physical characteristics of particular [material] configurations are crucial in shaping, if not quite determining, the possibilities for creating values" (Hudson 2008:436), therefore potentially affecting power relations and processes of embeddedness. Thus, the relevance of the materiality of waste – and in fact of things in general – for understanding the economy is incontestable.

The spatio-temporal dimension:

The economy, however, does not exist in a vacuum. Despite being intimately entangled with the process of value creation and appropriation, the space-time which mediates the economy has not gained the attention it deserves in the Cultural Political Economy scholarship, which generally refers to it merely as a frame of reference for semiotic and structuration processes: "the social and natural world becomes relatively meaningful and orderly for actors (and observers), and social interactions acquire a certain structural coherence in so far as limits are imposed on com-possible social relations in *a given spatio-temporal matrix*" (Sum and Jessop 2013:149 emphasis added). Despite recognising that "it is important to emphasize the relations between these three registers [political-economic, semiotic and material] and the flows and spaces through which they are co-constituted and the inter-

relationships among them" (2008:422–23), Hudson seems to regard space as a second rank category, a background which is worth accounting for but not to the extent of being regarded as a dimension of the Cultural Political Economy framework he envisions.

Such differentiation is, however, unsubstantiated, since spatio-temporal processes are a key element which moulds the everyday practices of the economy in its political-economic, material and semiotic dimensions. Rather than "empty matrices waiting to be filled with the diverse products of human activity (…), space and time are, in specific and quite profound ways, core components of capitalism" (Castree 2009:27), particularly in what concerns its mechanisms of capital accumulation. For that reason, it is crucial for a Cultural Political Economy informed study to acknowledge and explore the distinctive spatio-temporality of the capitalist mode of production, and to incorporate it as a core dimension of the analysis.

Long overlooked by social scientists as the backdrop against which social relations are staged, "a passive background variable providing little causal explanation or theoretical purchase" (Coenen, Benneworth, and Truffer 2012:976), space seems to have only recently consolidated its role as a protagonist in disciplines traditionally not concerned with the topic, such as anthropology, sociology and law, which have consistently privileged historical/temporal analysis over geographical enquiries (Soja 2010). The much-heralded 'spatial turn' denies the existence of an enmity or antinomy between space and time, since "life is spatial as well as temporal", and proclaims that "neither time nor space is reducible to the other; they are distinct. They are, however, co-implicated" (Massey 2005:29–55) and mutually shape one another.

This entwinement of space-time in the production and reproduction of social phenomena, and as such of the economy, is evident from the perspectives both of access to space (or the lack thereof) and of location; time is organically related to both. With regard to the first, I will consider how asymmetric access to space gives rise to peculiar temporalities and, therefore, affects attempts at value creation and appropriation, power relations and processes of embeddedness. The availability of storage space, for instance, determines how often a business purchases inputs and sells products, with direct implications for price.

Location, or "positionality (position in relational space/time within the global economy)" to use Sheppard's terminology, has similar effects and captures "the shifting, asymmetric, and path-dependent ways in which the futures of places depend on their interdependencies with other places" (2002:307–8). However, this is often obscured by advances in communication and transportation systems, which by "minimiz[ing] the turnover time of capital and (…) speed[ing] up production, marketing and consumption" (Harvey, 2006:100) while reducing costs associated with the circulation of goods in order to attend to the accumulative logic of capitalism, have the apparent effect of shrinking space. This phenomenon, described metaphorically by Marx as the "annihilation of space through time", seems to be justifying an undue disregard for space that this thesis intends to counteract, not least because, as Massey observes, "what is actually being reduced here is time, and what is being expanded (in the sense of the formation of social relations/interactions, including those of transport and communication) is space (as distance)" (2005:90–91).

Attention to spatio-temporal dynamics considered as a relational unity – which renders it impossible to prioritise either space or time – is therefore all the more crucial under a capitalist logic of accumulation, given the increased complexity and reach of markets conjoined with growing pressure to improve efficiency (Coe et al. 2008:276). Such pressures have uneven effects and lead to spatio-temporal inequalities that impact on the power of agents vis-à-vis one another and on their prospects in terms of value creation and appropriation.

Note that these four dimensions – political, semiotic, material and spatio-temporal – are interdependent and reciprocally constituted, providing the framework which I will use to analyse the recycling economy, conceptualised through the notions of value, power and embeddedness. My analysis, nonetheless, shall be primarily focused on the last two dimensions – material and spatio-temporal – since these are so far the least developed in the Cultural Political Economy scholarship. This thesis, therefore, will make a contribution to the theoretical framework of Cultural Political Economy, recalibrating it in order to foreground "the contingency and performativity of matter in political processes" (Hawkins 2009:187) and the active entanglement between space-time and afflictions that have long troubled social scientists, such as inequality, injustice, discrimination and oppression (Soja 2010). Not only humans and discourse, but also things and space-time, have the capacity to consolidate and preserve social order, power, scale and hierarchy and can therefore facilitate or endanger waste pickers' aspirations for socioeconomic empowerment, breaking or sustaining their adverse incorporation into the recycling economy. Therein lies the importance of accounting for these aspects when exploring the "meso-level of the institutionalized relationships from within which individuals

confront the strategic terrain of possibilities and constraints" (Stones 2009:99–101) which constitutes the recycling economy; after all, the eventual success of their attempts at interpreting and moulding this terrain depend upon whether political, semiotic, material and spatio-temporal mechanisms will prove to be impermeable or malleable.

4. METHODOLOGICAL FRAMEWORK

Having outlined the theoretical grounding of this thesis, this chapter moves on to outline the research methods used in the course of fieldwork and the reasons for the methodological choices made in this study. After a brief description of the limitations of the prevailing local-level case study methodology adopted by scholars interested in promoting waste pickers' empowerment, the first section moves on to examine alternative methodologies that use economic processes as guidance for setting the scope of the investigation. Structured around commodity chains and production networks, these methodologies are "heuristic device[s] for dealing with economic activities, actors, and processes apparent at multiple geographical scales and over time" (Phelps 2017:205), besides being interconnected and "heavily laden within asymmetries of power" (Coe et al. 2008:272), and therefore suitable for the attainment of the research aims. The first section ends by presenting the 'follow-the-thing' strategy as an adequate method which is able to correspond to the dynamicity required by these chain/network-based methodologies. Subsection 4.2 exposes the reasons behind the choice of PET bottles as the guiding thread for this follow-the-thing investigation. Subsequently, I explain the criteria used to delimit the research boundaries and edges, i.e. where to start and stop the tracing journey.

4.1. The heuristics of tracing networks by following things

The critique of the current academic approach to the study of waste pickers' socioeconomic deprivation that motivates and underpins my research is based not only on a discontentment with the cliché Social and Solidarity Economy theoretical

framework which most scholars have adopted, but first and foremost on the methodological limitations of their recurrent local level case study approach. Their bias towards local level methods of data collection leaves unaccounted for "processes that exist above and across these discrete units of analysis" (Bair 2005:156) and that are equally or more crucial to the process of empowering waste pickers. This section presents the concept of the Global Production Network as a methodological framework through which to study the recycling economy and account for these neglected processes, and follow-the-thing as a suitable method to go about uncovering and exploring the recycling network.

I should begin by clarifying that there is nothing *a priori* wrong with case studies or methods focusing on local level interactions. My concern is that this approach has become too mainstream among scholars interested in waste picking in Brazil, to the point that studies do not seem to be produced with the intention of generating new insights into empowerment – being more and more a repetition of previous studies, perhaps in a different setting – but rather in order to serve as an advocacy tool pushing forward the cooperatisation and formalisation agenda. This results in a complete neglect of the interdependency between local processes and multi-scalar institutional structures (Coenen et al. 2012) and in imputing to waste pickers the responsibility to adjust their internal mode of organization and external mode of interaction to fit and conform to pre-existing structures in a slightly adapted or even unaltered environment, as if such an environment was ideal. This, in turn, leads to the false assumption that waste pickers are themselves accountable for their own underprivileged condition, placing on them the responsibility for change.

4. Methodological Framework

Under the capitalist urbanisation process, cities have been transformed into a kaleidoscopic, metabolic socio-environmental milieu that stretches from the immediate environment to the remotest corners of the globe (Heynen and Swyngedouw 2003), hence justifying the importance of an awareness of the scalar geometry of socio-political-ecological processes operating at a variety of articulated and interdependent geographical scales (Heynen and Swyngedouw 2003). The urban, as Brenner reminds us, "is not only a nested level within supraurban territorial hierarchies but also the product of dense interscalar networks linking dispersed geographical locations" (2000:364). Thus, academic investigations, such as this thesis, which are committed to producing an emancipatory research that aims at "identifying the strategies through which a more equitable distribution of social power and a more inclusive mode of environmental production can be achieved" (Heynen and Swyngedouw 2003:914) should not concentrate on specific and predetermined scales, whether urban, suburban or supra-urban. Far from being neutral, scales are imbued with politics (Latour 1996) and may hide relations of domination and exploitation. Studies sharing this critically transformative view would profit from being guided by a process-based approach to scale, allowing social processes to reveal how particular scales become constituted and reconstituted (Heynen and Swyngedouw 2003) in the constant societal struggle for control and power. After all, "an important aspect of power is exactly how it manages to traverse scales, and reproduce itself in different concrete situations" (Gille 2010:1053).

The approach adopted here is animated by the World-Systems school of thought, which insists on the use of economic processes – rather than juridical, geological or any other criteria – as parameter for defining the analytical scope of

investigations interested in understanding aspects of the distribution of productive tasks among participants of the global economy (Hopkins and Wallerstein 1977). Although frequently moving away "from the type of long-range historical and holistic analysis characteristic of the world-systems school" (Bair 2005:158), a growing number of scholars have turned to commodity chains, also termed value chains, as an object of study, in an effort to unravel the "the nexus of interconnected functions, operations and transactions through which a specific product or service is produced, distributed and consumed" (Coe et al. 2008:274). As Bair and Werner contend, "the interdisciplinary appeal of the chain heuristic lies in its ability to ground abstract-prone analysis of economic globalization in the everyday practices of firms, workers, households, states, and consumers" (2011:988).

While some among such scholars are more optimistic and present global commodity chains as an avenue for the social and economic upgrading of smallholders and workers at the bottom of the chain, provided that favourable institutional and governance arrangements are in place (Dolan and Humphrey 2000; Gereffi and Lee 2016; Lee, Gereffi, and Beauvais 2010), others adopt a more critical stance, defying the organizational structure of global commodity chains and their intrinsic power asymmetries that lead to unequal exchange relations and consequently to the exploitation of workers in the Global South (Barrientos and Kritzinger 2004; Pegler 2015; Selwyn 2018). Not to be forgotten are those who stand in-between, arguing that participation in the global economy is inevitable and, therefore, the issue is "how to do so in a manner which provides for sustainable and equitable income growth" (Kaplinsky 2000:117).

Regardless of their positionality, however, by broadening the analytical frame to include an "appreciation of the important differences between the qualitatively distinct social relationships and processes that underscore production" (Taylor 2007:532), their work exposes the socioeconomic effects of the international division of labour and the global dynamics of value creation and capture. In so doing, this scholarship helps to elucidate the relationship between phenomena observed at the local, national, regional and global levels (Sturgeon 2001) – in other words, asking "how do the new organizational styles and subjectivities crafted for capitalist elites travel to more humble workplaces?" (Tsing 2009:150) – hence shining light on the distribution of rewards, power, risks, and tasks among the parties involved in commodity chains (Bolwig et al. 2010; Lepawsky and Billah 2011).

Not all scholars moved by Hopkins and Wallerstein's (1977) urging to allow economic process to determine the scope of analysis adopt the metaphor of a chain, however. There are different strands of research which commonly cluster around three main theoretical frameworks: global commodity chains, or GCC; global value chains, or GVC; and global production networks, or GPN. The first two tend to focus on a limited number of variables related to the transactional relationships between firms in a commodity/value chain, often trying to unveil the power imbalances and governance mechanisms institutionalized by certain actors to control the appropriation of value across the chain (see, for instance, Gereffi, Humphrey, and Sturgeon 2005; Gibbon, Bair, and Ponte 2008; Lee et al. 2010), although based on different governance models and typologies: "the network construct of the GCC approach encompasses all the firms that are involved in the production of a particular good or service, while the abbreviated network of GVC theory consists of the dyadic

transaction between two particular firms" (Bair 2008:359). Global value chain scholars often aim to identify the possibilities that may lead to poverty alleviation by enabling greater value appropriation by firms in less developed countries (Taylor 2007).

Global production network analysis, on the other hand, offers a multidimensional relational framework that aims to account for a wider array of relevant actors, processes and relationships beyond the linearity that characterises global value chains, despite the practical problems that come with such a concern for comprehensiveness (Coe et al. 2008). This demonstrates a clearer awareness of the social and institutional context in which production networks are embedded and of the critical effects of such embeddedness in the dynamics of production and governance (Lepawsky and Billah 2011; Taylor 2007). The "preference for a discourse of 'production' places the analytic emphasis on the *social processes* involved in producing goods and services and reproducing knowledge, capital and labour power" (Henderson et al. 2002:444 emphasis in original).

The valuable political-economy insights deriving from these approaches, which are key to understanding "the dilemmas of the human condition today", including "deliberations on wealth and justice" (Tsing 2009:148–49), encouraged me to entertain the possibility of problematizing waste pickers' socioeconomic condition using them – more specifically, the Global Production Network approach – as a methodological framework. This would necessitate strategically altering the methodological focus of the investigation to place waste in the spotlight. However, the focus of the extant literature on a particular stage of a commodity's lifecycle, i.e. production, and on a limited number of export commodities, mostly food and

fashion, that flow in a unidirectional way from the Global South to the Global North (Gregson et al. 2010:848), raises a series of questions concerning the study of waste. Are the existing frameworks applicable and useful to the study of the afterlives of commodities? Does focusing on waste offer the possibility of broadening up the scope of application of these approaches beyond their usual object and directionality, either tracing relations forwards departing from a leading production firm, or backwards beginning from western consumers to unveil the exploitative reality of production in the southern part of the globe (Reimer and Leslie 1999:404)?

A few illustrative and inspiring exceptions gravitating around end-of-life goods were decisive in asserting the feasibility and usefulness of applying a commodity/production-based approach to this research. Lepawsky and Billah, for instance, innovate both in their choice of commodity and directionality while examining "what happens to electronics deemed to be waste in the North when they are brought to certain parts of the South" (2011:121). Crang et al. concentrate on used clothing and end-of-life merchant ships to explore the dynamics of global recycling networks and inquire "what challenges the rekindling of value in used goods creates for global commodity chain analysis and what insights those approaches bring to looking at waste flows" (2013:12). Finally, Furniss demonstrates "through a discussion of Egypt-China trade in PET plastic, [that] (…) contemporary recycling economies do not all conform to North-South directionalities" (2015:24). These studies prove that the validity of a commodity/production-based approach as a methodological tool is not contingent upon what is circulating and in which direction, hence evincing the applicability of the framework to the present case.

4. Methodological Framework

This research more closely aligns with the Global Production Network scholarship in sharing the underlying assumption that the concept of the network better reflects the structural organisation of production, comprising a series of horizontal and vertical processes which are inseparable from their wider social and institutional context (Taylor 2007). After all, "context is not noise disguising reality but reality itself" (Burawoy 1998:13). Nevertheless, based on my focus on postconsumer goods, throughout this thesis I shall refer to the production networks of recyclables as 'recycling networks', therefore endorsing the nomenclature proposed by Crang et al. (2013).

I should say pre-emptively that, although the term 'global' in Global Production Network has been mostly concerned with the transboundary movement of commodities, i.e. instances when the "production of a single commodity spans many countries, with each nation performing tasks in which it has a cost advantage" (Gereffi and Korzeniewicz 1994:1), what is central to this approach is not the physical crossing of national borders by commodities. The use of the word 'global' expresses the often subtle dialectics between global and local processes of governance, i.e. "the way in which non place-specific processes penetrate and transform place-specific ones, and vice-versa" (Henderson et al. 2002:445). These global forces can take the form of transboundary "flows of capital, labour, knowledge, power etc." (Henderson et al. 2002:438) through the intervention of multinationals, for instance. The utility and strength of the framework, therefore, lies precisely in its network-based approach to the study of the dynamics of markets and industries.

As Kaplinsky contends, “increasing inequalities are not just being experienced at the inter-country level, but also with regard to intranational distribution” (2000:142), and in this case too production network analysis has a role to play. Hence, the fact that fieldwork for this research was entirely carried out in Brazil does not by any means discredit the use of the global production network framework as an inspiration for this thesis, not least because, given the territorial dimensions of Brazil – twice the size of the Schengen Area, and the world’s fifth largest country by area – the flow of commodities within its territory is perhaps just as complex and interesting as transnational flows. In any case, it should be noted that the geographical scale of the study was not pre-set, but rather emerged during the course of fieldwork, and since the study had an exploratory goal, it was not possible to know beforehand whether the commodity examined, i.e. recycled PET, would be sold in the domestic or in the international market.

Thus, aiming to contribute to further elucidating the mechanisms engendering waste pickers’ socioeconomic deprivation in Brazil, this thesis zooms away from the dyadic relations between waste pickers and local authorities to reset its scope around a recycling network as a fluid “construct that can move between and across different levels of analysis” (Bair 2005:156). By strategically placing materials at the core of the investigation and privileging “an analysis centred on *flows* of material resources, finance, knowledge and information between buyers and suppliers (where ‘upstream’ signals flows towards production, and ‘downstream’ towards consumption)” (Bolwig et al. 2010:175), this thesis will be able to explore the macro level whilst delving into the detail of the micro level, without losing sight of the positionality of waste pickers and of the many other actors partaking in the

network (Coe et al. 2008). This, in turn, demanded dynamic heuristic methods that allowed for the unfolding of the geographical scope of the study as the research progressed, "following the network to wherever it leads, instead of setting system boundaries in an arbitrary and closed-off way" (Coenen et al. 2012:977), while concomitantly uncovering the "mechanisms of scale [formation and] transformation through social conflict and political struggle" (Heynen and Swyngedouw 2003:913).

Inspired by the plot of the documentary *Ilha das Flores* (1989), by the Brazilian film-maker Jorge Furtado, which tracks the lifespan of a tomato from the farm where it is grown to the dump where it is finally disposed of, and premised on the assumption that things-in-motion can better illuminate their socio-spatial context (Appadurai 1986), this thesis uses the follow-the-thing research method. This approach gained notoriety among researchers after Marcus (1995) surveyed an emergent methodological trend in interdisciplinary research to carry out multi-sited ethnography, referring to follow-the-thing as one possible method among several others. Christophers (2011), however, claims that it emerged as a response to David Harvey's urge to trace back the "intricate geography of production and the myriad social relationships embedded in the system that produce it" (1990:422). Since then, a number of studies have followed suit using the follow-the-thing method to "build a picture of the process of value transformation that accompanies a commodity's economic and geographical circulation – a picture that can help reveal, the layers of value peeled *off* (as money) by different economic agents at different stages of the process" (Christophers 2011:1074 emphasis in original; see, for instance, Cook 2004; Cook and Harrison 2007; Gregson et al. 2010; Hulme 2015; Knowles 2014; Rivoli 2014; Rothenberg-Aalami 2004).

If the follow-the-thing method allows for an appreciation of "the world system [a]s not the theoretically constituted holistic frame that gives context to the contemporary study of peoples or local subjects (…) [but rather as] integral to and embedded in discontinuous, multi-sited objects of study" (Marcus 1995:97), it is not without its challenges. Unlike single-sited ethnographies which demand a one-off negotiation of access at the point of entry into the field, studies based on data collection on multiple sites carry the burden of a constant negotiation of access as the researcher moves along the thread that motivates his/her investigation. In my experience, dealing with such a burden required a dose of persistence and another of flexibility in order to adjust research plans and follow alternative routes when access was difficult to obtain or simply non-negotiable, as was increasingly the case as I made my way outwards through the recycling network.

The richness of detail provided in Chapters 6 and 7, for instance, reflects the fact that I spent a lot more time with waste pickers and dealers at *Lixão da Estrutural* and with members of *Recicle a Vida* than with other research participants, as a result of them being more open to me as a researcher than other nodes of the recycling network. The farther out I went in the network, the more internal protocols I had to follow in order to obtain access. Although receptive and a lot more open than their competitors, the recycling company *M&G Fibras* (Chapter 10) and the manufacturer of homecare products *Ypê* (Chapter 11) still had their own procedures when it came to allowing visitors into their plants, which I understand as being only natural in a market environment.

If it is true that "[t]he most seismic interventions are often entry into and departure from the field" (Burawoy 1998:17), then researchers deploying the

"follow-the-thing" method are constantly crossing unsteady terrain, for the field is not single, but constituted by multiple sites and, therefore, multiple entries and exits. Perhaps most importantly, the field is composed of multiple actors and groups with often competing interests, which requires extra effort on the part of the researcher to overcome the natural resistance that any group offers to being studied, and to take care not to create any further layers of objection; an effort, in any case, worth making.

At this point, it is worth mentioning that, despite sharing the social justice impetus that commonly permeates studies adopting the follow-the-thing research method, this thesis deviates from the bulk of such literature due to five main interrelated reasons. First and fundamentally, this thesis is not concerned with ethical consumerism and, in fact, does not account for the consumption phase of the network, which normally "bookends the commodity's journey" (Christophers 2011:1076), rather limiting its tracing to the point where recyclables have been completely transformed and are ready to enter the consumer market, as shall be discussed in more detail in subsection 4.3. Second, it is not centred around "things that remain stable as they circulate", instead privileging "things that are either coming apart or being disassembled" (Gregson et al. 2010:846) to become something else. Third, it is not my intention to "expose a (simplified) global North (consumption) – Global South (production) axis" (Knowles 2014) inasmuch as the tracing effort that motivated the investigation was entirely carried out within Brazil from beginning to end. Although inevitably influenced by global pressures – as is likely the case with almost every market possibly in every corner of the world – mostly through fluctuations in the price of virgin raw materials, the market for PET

(polyethylene terephthalate), the recyclable chosen to animate this follow-the-thing investigation, is predominantly domestic in Brazil. All parties that have taken part in the research are based in Brazil, although one outer node of the network is a branch of a multinational corporation. Fourth, this research is just as interested in following things as it is in understanding why certain things are prevented from circulating. Ascertaining the gaps or disarticulations in an object's trajectory and bringing them to the fore of the analysis is perhaps just as methodologically valid as charting followable paths (Hulme 2017:159), and may present an opportunity for devising "counter-hegemonic connections across the vast social and spatial differences that make much commodity production possible" (Bair and Werner 2011:996). Finally, and related to the points mentioned above, this thesis does not trace an object back to its origins, rather following the network outwards in the same directionality as production.

These distinctions help in dismissing criticisms that could potentially be made of this thesis for using the follow-the-thing method, such as the claim that the method lacks in novelty and insight given that the globalised nature of "commodity chains no longer have the shock of the new; discovering the sweatshop workers at the end of a chain, while of course valuable, is not surprising enough – not as horrifying as it should be, suggesting some level of de-sensitising" (Hulme 2017:158). Repurposing the method to serve different aims not necessarily related to raising the awareness of western consumers about their responsibility towards what they consume – which, in any case, they can control only to a certain extent – and consequently reframing it around the flows and disjunctures of commodities which are not necessarily export-oriented, is perhaps a fitting way to recast the usefulness

of following-things, making visible processes and inequalities which are more tangible, and therefore can be more easily fought.

4.2. The thing to follow: PET bottles

The theoretical choice to use materiality as a key concept in my analysis of recycling networks, which signals a "holistic concern with the understanding of the meaningful relationship between persons and things" (Tilley 2007:19), underscores the importance of the methodological delimitation of the *what* of this tracing exercise. If things are implicated in social acts and constitutive elements of the social world (Tilley 2007), than they must be accounted for in their specificity. Among the four most common categories of recyclables – paper, metal, glass and plastic – I chose the latter for reasons that will be clarified below. Nonetheless, as I will also make clear in the following paragraphs, I had to further delimit my choice of guiding thread.

It is hard to ignore the ubiquity of plastics today. The versatility of this synthetic organic compound derived from petroleum – and also its lightness and cheapness – enabled the progressive replacement and displacement of older materials, such as wood, metals and glass, in an array of diverse applications throughout the twentieth century (Vincent 2013). Plastics are so deeply ingrained in our lives and daily routines, influencing how we eat, move, communicate and work, that it has become a commonplace to say that we are living in a 'Plastic Age'. However, the "material recalcitrance of plastics" (Bennett 2010a) is often relegated to a background passivity, which is deliberately orchestrated in service of the materialistic lifestyles that prevail in our globalized culture of hyper-consumption.

After all, the logic of disposability and of a linear production and consumption model such as the one we currently live in can only prosper by ironically concealing the vitality of materials, i.e. the manifest and "curious ability of inanimate things to animate, to act, to produce effects dramatic and subtle" (Bennett 2010a:5–6).

Plastics are estimated to correspond to over 20% of the dry portion of global municipal solid waste (Kaza et al. 2018). Yet, if we briefly stop to think about how almost every item we buy is wrapped and/or packed, even if partially, in plastic (lids, caps, and labels, for instance), we may in fact realise that this is likely an underestimation of how much plastic waste we generate yearly, especially since this figure does not account for plastics which are not properly disposed of and therefore do not make it to final disposal sites, instead lingering in the environment.

With a fast-rising annual global level of plastic production, amounting to 348 million tonnes in 2017 alone (Plastics Europe 2018) sustaining this neglectful attitude towards plastics, the epitome of our culture of disposability (Gabrys, Hawkins, and Michael 2013), is an ever more challenging task. Our bodies and environment are living depositories of the archaeological reminiscences of our plasticised life and, as such, are "reconstituted through the lingering and residual effects of plastics" (Gabrys et al. 2013:11). Disturbing photos of turtles trapped in six-pack rings and of dissected seabirds, fish and whales with their stomachs filled with plastic debris unveil the (not-so-)hidden afterlives of plastics, and indicate both their pervasiveness and endurance, serving as a preliminary justification for my interest in this group of materials in particular.

Plastics, however, are a general category, and in fact a misnomer, with the word referring to synthetically produced polymers – i.e. long-chain molecules

formed by the repetition of smaller identical units (monomers) – not all of which share the same characteristics and properties. Some can be heat-softened and moulded, and eventually re-melted once cooled (Fried 2014), hence their designation as thermoplastics, which makes them particularly suitable for short life applications, such as in packaging, given the possibility of recycling after use. In fact, when we think of plastics we are most likely thinking of thermoplastics, with two of the most probable mental representations being that of a plastic bottle or bag. This association is not fortuitous, however. The packaging sector accounts for close to 40% of the total demand for plastic resins in Europe, for example (Plastics Europe 2018). In Brazil, packaging accounts for a slightly smaller, but still significant, share of the demand for plastics, at 31.1% (ABIPLAST 2018).

Not all thermoplastics have the same chemical composition or molecular structure, though, and it is precisely these differences which ascribe them different properties. For such properties to be preserved in the recycling process, plastics must be categorised and sorted according to resin type. In other words, due to differences at the molecular level, not all thermoplastics used in packaging – and in fact in any other application – can follow the same value chain once disposed of and if reclaimed for recycling. Different types of plastics follow different circuits, go through different processes, and connect different actors and places, which is an early indication of their active participation in socio-political processes. Hence, a study of recycling economies that has materiality at the core of its analytical toolkit has to be more specific in terms of the material which serves as guiding thread for the research; it does not suffice simply to state that this work is centred around plastics.

4. Methodological Framework

In 1988, the former American Society of the Plastics Industry (currently named the Plastics Industry Association) created the Resin Identification Code (RIC), a technical standard that uses numerical symbols to identify the six most common types of thermoplastic resins used in packaging by engraving the corresponding number on containers, with the aim of facilitating sorting and hence recycling (see Figure 1). The RIC was adopted by many countries all over the world, Brazil included (see ABNT 2008). Initially, the symbol consisted of a triangle formed from arrows circulating clockwise and enclosing a number from 1 to 7, each associated with a different type of plastic resin, except for the number 7 which clusters other types of plastics not specifically included in the standard. In 2010, the American Society for Testing and Materials International (ASTM International), currently in charge of administering the RIC, reviewed the symbol and replaced the arrows with a solid equilateral triangle in an attempt to underscore the core mission of the coding, i.e. to identify resins and not to make environmental claims as to the recyclability of containers (ASTM International 2013). The old symbol, however, remains widely popular and is still in use.

Which of these resins should I pick, and for what reasons? PETE or PET, number 1 in Figure 1, was chosen because of its high recyclability and wide availability in waste streams in Brazil, which in turn generate significant, traceable flows, and, most importantly, due to it being the largest single source of income among the plastic resins for waste pickers in the country.

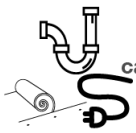
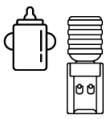
Symbol	Polymer	Common Uses	Properties
1 PETE	Polyethylene terephthalate	 Plastic bottles (water, soft drinks, cooking oil)	Clear, strong and lightweight
2 HDPE	High-density polyethylene	 Milk containers, cleaning agents, shampoo bottles, bleach bottles	Stiff and hardwearing; hard to breakdown in sunlight
3 PVC	Polyvinyl chloride	 Plastic piping, vinyl flooring, cabling insulation, roof sheeting	Can be rigid or soft via plasticizers; used in construction, healthcare, electronics
4 LDPE	Low-density polyethylene	 Plastic bags, food wrapping (e.g. bread, fruit, vegetables)	Lightweight, low-cost, versatile; fails under mechanical and thermal stress
5 PP	Polypropylene	 Bottle lids, food tubs, furniture, houseware, medical, rope, automobile parts	Tough and resistant; effective barrier against water and chemicals
6 PS	Polystyrene	 Food takeway containers, plastic cutlery, egg tray	Lightweight; structurally weak; easily dispersed
7 OTHER	Other plastics (e.g. acrylic, polycarbonate, polyactic fibres)	 Water cooler bottles, baby cups, fiberglass	Diverse in nature with various properties

Figure 1. Resin identification: symbols, common uses and properties. This thesis is centred around polyethylene terephthalate, PETE or PET. Adapted from *FAQs on Plastics*, by Our World in Data, retrieved from https://ourworldindata.org/faq-on-plastics, accessed on 09/04/2019.

According to a report produced by IPEA (2012), based on research carried out with 83 cooperatives of waste pickers in Brazil between 2005 and 2010, plastics make up nearly a quarter of the materials they collect in terms of weight, second only to paper and cardboard, which correspond to over half of the resources they reclaim from waste (see Figure 2). Furthermore, the revenue yielded by plastics is significantly higher than that of paper and cardboard, and amounts to approximately 40% of their monthly income (see Figure 3). Polyethylene terephthalate, or PET, is not only the most prevalent amongst the plastic resins, corresponding to a quarter of all the plastic reclaimed by waste pickers, but is also the most profitable resin type, corresponding to roughly a third of the revenue yielded by plastics.

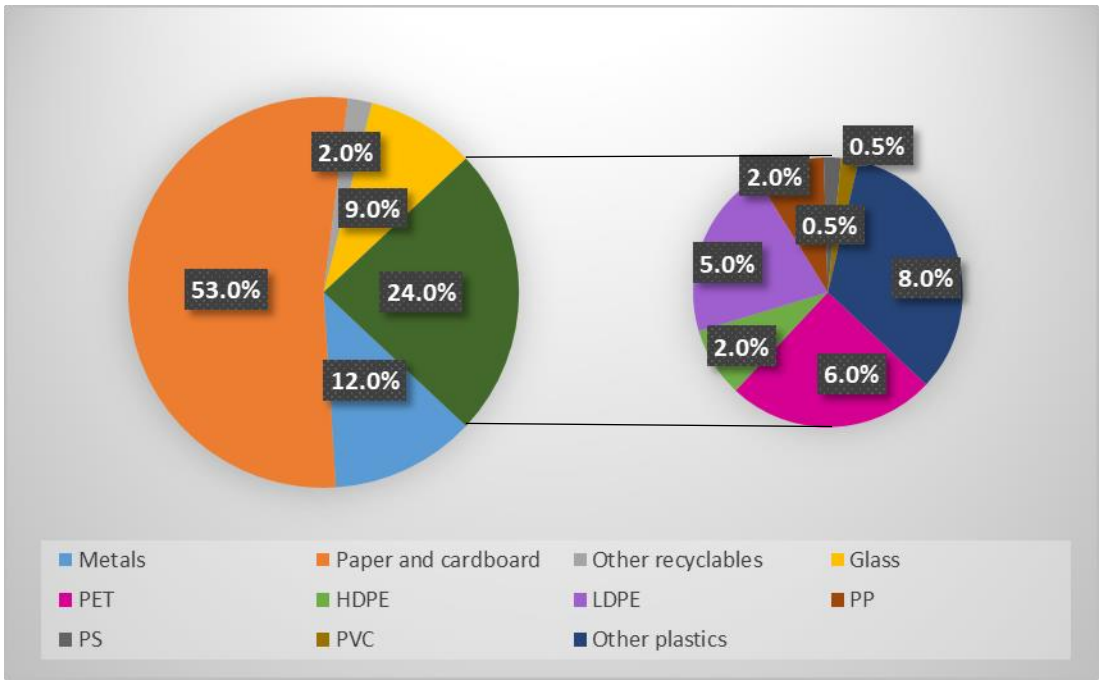


Figure 2. Gravimetric analysis of materials collected by waste pickers by percentage of the total weight – 2005/2010. The pie chart on the left clusters recyclable materials into five categories: plastics, metals, paper and cardboard, glass, and other recyclables. Plastics (dark green slice) were then subvided into the seven most prevalent types of resin in the pie chart on the right. Data retrieved from *Diagnóstico sobre catadores de resíduos sólidos – Relatório de pesquisa* (p. 24-26), by IPEA – Instituto de Pesquisa Econômica Aplicada, 2012, Brasília: IPEA.

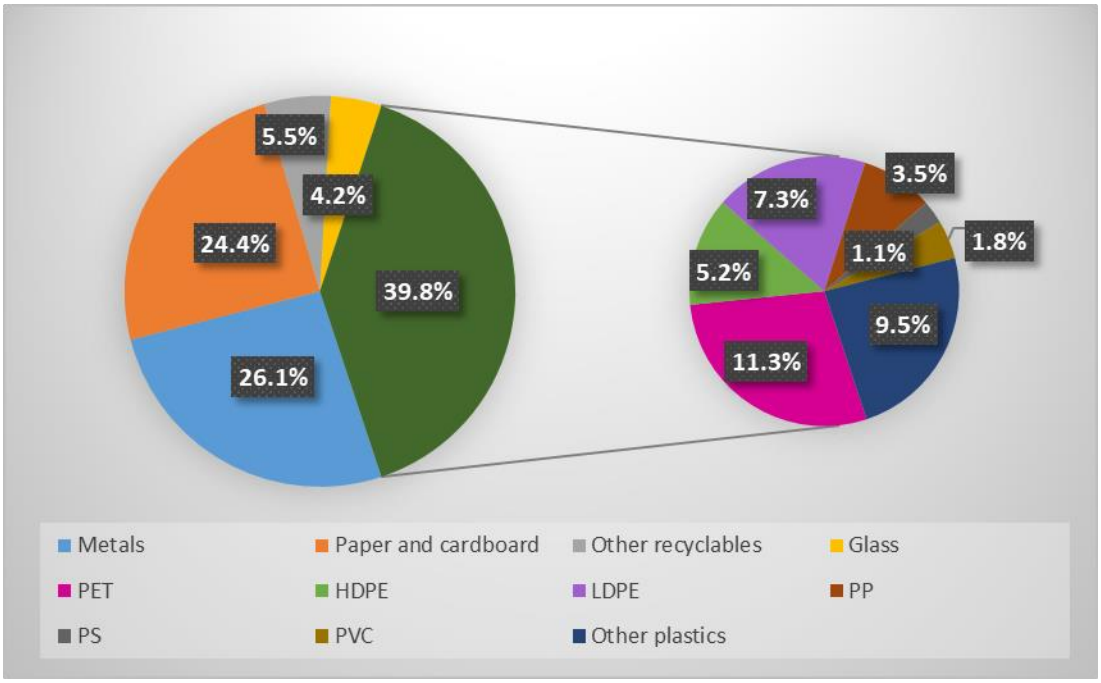


Figure 3. Average composition of Brazilian waste pickers' income per type of recyclable by percentage – 2005/2010. The pie chart on the left splits waste pickers income according to sales revenue from five categories of recyclables, i.e. plastics, metals, paper and cardboard, glass, and other recyclables. Revenues from the sale of plastics (dark green slice) were then subvided into the seven most prevalent types of resin in the pie chart on the right. Data retrieved from *Diagnóstico sobre catadores de resíduos sólidos – Relatório de pesquisa* (p. 28-30), by IPEA – Instituto de Pesquisa Econômica Aplicada, 2012, Brasília: IPEA.

The strategic nature of PET in securing waste pickers' livelihoods provides a critical reason for the author's decision to centre this materiality-aware study around this type of plastic resin. Since bottles are the quintessential representation of a PET product, it is only natural that the PET bottle was chosen as the emblem for this follow-the-thing research journey.

4.3. Boundaries and edges: choosing entry and exit points and moving between them

After deciding upon the *thing* to animate this follow-the-*thing* journey, the next critical choice was to delimit the boundaries and edges of the research, or

"where and when should [the] analysis actually begin, and where and when should it end" (Christophers 2011:1076). This section deals with such choices, and provides further information about my journey between the boundaries and edges of the research, including considerations about where I carried out fieldwork, for how long, and the data collection techniques I used.

Production networks, particularly those which work in closed-loops, like PET recycling, have no inherent directionality or well-defined beginnings and endings (Lepawsky and Mather 2011); therefore, any initial and final cut-off points adopted would be fundamentally artificial, being "better conceptualized as provisional moments in the ongoingness of economic action and material transformation" (Lepawsky and Billah 2011:135). Hence, notwithstanding this thesis' commitment to avoid a priori delimitations of the geographical scope of study, and despite agreeing with Coe et al.'s view of the choice of starting point as only a minor, though inevitable, step which is in no way as important as the observation of a relational approach "to reveal the complex interconnections and interdependencies (…) that constitute GPNs and influence the processes of value creation, enhancement and capture therein" (2008:290–91), defining criteria for selecting the entry and exit points of this investigation was unavoidable.

This thesis has no pretension to enter discussions about consumer behaviour or waste collection and disposal practices, as it was designed around the political organisation of the PET recycling market, and particularly the power relations between waste pickers and other downstream market players. Therefore, initiating the investigation at the moment when the value of PET bottles begins to be reasserted, embodied in the act of reclaiming, was an instinctive choice. When waste

pickers collect PET bottles they re-signify them, appraising their immanent value, which has not been extinguished by the act of disposal, but only made latent (Lepawsky and McNabb 2010). This single act turns bottles from waste back into a resource again, since value is always "in the making rather than an intrinsic property of things" (Lepawsky and Billah 2011:126)

However, waste pickers in Brazil are not a monolithic category; some work collecting recyclables in the streets, others have a shed, whilst others still work at disposal sites, these last surely being those subject to the worst working conditions as well as being the most socioeconomically deprived among waste pickers, due precisely to the stigma surrounding their working environment. Although this heterogeneity permeates the discussion in Chapters 6 and 7, where I examine, among other things, working conditions at different areas of *Lixão da Estrutural* and at *Recicle a Vida*, respectively, it is most clearly evident in subsection 7.1, which deals with the micro-politics of recycling in the Federal District.

The growing interest around dumpsites which was generated as a result of discussions on how to operationalise the National Waste Policy enacted in 2010 (Law 12.305/2010), according to which all open dumpsites should be closed by August 2014 and replaced by environmentally sound disposal methods – as vague as that expression might be – contributed to the decision to begin this research at a dumpsite. The 2014 deadline was not met by most cities which rely on dumps as their main waste disposal facilities, and mayors, who are constitutionally in charge of managing solid waste in Brazil, put pressure on congressmen to revise the law and extend the deadline, claiming it was unrealistic.

4. Methodological Framework

According to a report published by the Brazilian Ministry of Cities months prior to the start of my fieldwork, Brazil had close to 2,000 dumpsites in operation (Ministério das Cidades 2016:110), corresponding to over 50% of the waste disposal facilities in the country. My interest lay particularly in dumpsites located outside the Southeast of Brazil, which, due to being the richest and most developed region of the country, is where academic efforts tend to be concentrated. I chose *Lixão da Estrutural* because, as stated previously, it was the biggest dumpsite in operation in Brazil and one of the five largest in Latin America (ISWA 2016:4) at the time of the fieldwork, and was – perhaps implausibly – located less than 20 kilometres from the President's official residence and workplace in Brasília, the capital of Brazil.

Brasília has a peculiar legal status in the political structure of Brazil, as it is technically not a city. It corresponds to the urban portion of the Federal District of Brazil which, according to the Brazilian Constitution, cannot be politically subdivided into municipalities, being rather organised around 31 administrative regions for the purpose of decentralising and coordinating the delivery of public services. The dump in question, officially named *Aterro Controlado do Jóquei* – in English, Jockey's Controlled Landfill, given its proximity to a now-closed jockey club – is located in the administrative region known as SCIA-Estrutural, explaining the nickname given to the dump: *Lixão da Estrutural*, or Estrutural Dumpsite. In operation since the foundation of Brasília in 1960, this site used to be the single final disposal site of all municipal solid waste and construction waste generated in the Federal District (SLU-DF 2016). I say 'used to be' because the site was officially closed in January 2018, a year after the new landfill site of Brasília was inaugurated.

However, *Lixão da Estrutural* remains in operation for the disposal of inert matter, i.e. demolition waste.

Departing from *Lixão da Estrutural*, the research progresses through a 7-month-long journey along the recycling network, connecting a number of actors through multiple sites using a snowball referral technique and a mixture of interviews and participant observation. This journey culminates with the revaluation and repurposing of PET into a new product, ready to re-enter the consumer market and start a new cycle. This happens after PET has traversed 1,045 km and has been sorted, pressed, baled, shipped, de-baled, washed, re-sorted, crushed, re-washed, pelletised, bagged, shipped, de-bagged, melted, pre-formed and then finally blown-moulded into bottles for washing-up liquid at 'Ypê', a national producer of homecare products whose main plant is located in Amparo, in the state of São Paulo.

My choice of end point by no means implies that from this moment onwards the relations and processes involved in distributing and consuming products packed in recycled PET bottles will cease to bear consequences for waste pickers. It is merely the frame I am proposing with the use of a measure of discretion, given that, despite the non-existence of self-evident boundaries or end-points for the analysis of production networks (Coe et al. 2008; Lepawsky and Billah 2011), the research must inevitably draw to a close at some point. Continuing to follow PET bottles beyond the point at which they have been completely transformed and repurposed would involve accounting for a number of variables related to consumer behaviour which are not as straightforwardly connected to waste pickers' socioeconomic conditions as are other factors which relate to agents directly involved in the recycling economy. That, in turn, would substantially broaden the scope of this study as originally

envisioned, and would probably require certain adaptations to the theoretical and methodological framework which I was unwilling to make, not least because they would demand more funding than was available to me. My choice, therefore, was to leave that section of the production – as well as consumption – network open to future inquiry by those interested in unravelling the myriad intricate connections between consumption and poverty.

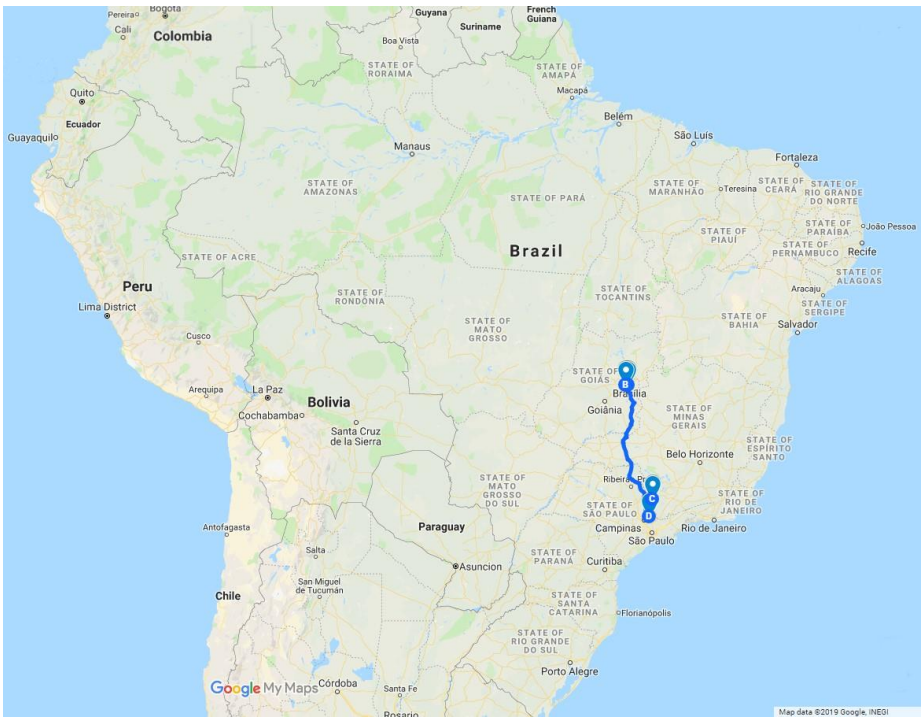


Figure 4. The journey of PET bottles from *Lixão da Estrutural* to *Ypê*. Retrieved from Google Maps, 2018 [http://bit.ly/35FqZaB].

The route represented by the blue line on Figure 4 corresponds to one of the many possible trajectories followed by the PET bottles reclaimed by the waste pickers with whom I interacted at *Lixão da Estrutural* as they are recycled. At some nodes, the fate of the bottles diverged and I had to make a choice – or in some cases had no choice – about the path I would follow. The reasons behind my choices, or

lack of alternatives, will become clearer as I narrate my journey in the following chapters. I should, however, stress that the journey of the PET bottles which animates this follow-the-thing investigation does not coincide with my literal fieldwork journey, i.e. with the route I personally followed as I was collecting data, for two main reasons.

First, although I originally intended to follow PET bottles closely all the way from being reclaimed to being transformed into a new final product, including their transportation, at certain points, which shall be highlighted in due course, I decided to separate from them and later reconvene with them at their destination. This was the case with long shipping journeys, for instance. Unfortunately, Brazil remains an extremely sexist country, and I did not judge it to be safe for me to ride alone with a stranger for hours on end through roads and regions with which I was not familiar. I also did not see the purpose of incurring the extra research cost of hiring a car to physically follow a lorry carrying PET bottles as they were shipped, given that I could easily obtain information concerning transportation from freighters as they collected or delivered bottles.

Finally, despite the inevitable linearity or verticality of the structure of any network aiming to add value through a process of sequential transformation, I tried to remain aware of the much wider sets of multi-dimensional non-linear relationships in which each stage of production is embedded, "without, at the same time, losing sight of the 'directed' nature of the processes involved" (Coe et al. 2008:274–75). In other words, although only actors and locations directly involved in the handling and processing of the PET bottles followed in this investigation are plotted in Figure 4, I visited, observed and interviewed a wider set of actors during the fieldwork period,

both in person and online. These include NGOs, governmental bodies, a network of cooperatives and a sectoral organisation, as well as a Whatsapp™ group for wholesalers and recyclers of PET, which I have been observing for over 2 years in order to better grasp the functioning of the broader PET recycling economy.

5. ENTERING THE FIELD: SOME CONTEXT AND EARLY REFLECTIONS ON ETHICS AND POSITIONALITY

As part of the process of planning this research, I had to obtain ethical clearance from the University of Edinburgh before going into the field. As a Brazilian national, I did not require special authorization from any in-country agency to carry out research in Brazil. While in the field, however, I did have to obtain permission from SLU-DF, the government agency in charge of managing municipal solid waste in Brasília, to enter *Lixão da Estrutural*. Although this process was fairly fast and simple – consisting of a one-page form wherein I had to describe the scope of the research and the methods of data collection, and declare if I would be taking pictures and recording videos – the standard protocol I was asked to follow during my visits to *Lixão da Estrutural*, i.e. reporting to the administrative staff of the dump upon my arrival in order to have someone to escort me, bothered me due to the implications I anticipated it could have for the research. I will explore this factor in Chapter 6.

Obtaining ethical clearance from the University of Edinburgh was a useful exercise in terms of anticipating, and therefore taking precautionary measures to avoid, some of the possible problems that could arise and dilemmas that I could face while in the field. In theory, ethical considerations seemed very straightforward and simple, until the fieldwork inevitably brought all the complexities intrinsic to real life. In this chapter I will discuss some of the ethical challenges I had to overcome both in the process of data collection and while writing up. It opens with a reflection on procedural ethics, where issues primarily concerning compensation, informed

consent and anonymisation are examined. It then moves on to a discussion around situational ethics, where I will explore how my stance, and in fact my own being in the world, might have affected my engagement with research participants and interfered in the data I accessed. These considerations are paramount here because they refer to my entry into the field and therefore have a bearing on the unfolding of the research. I shall also attempt to make the case, following Moser (2008), that in practicing reflexivity, our individual personality, or social abilities are just as important as our positionality, in terms of social categories.

Considerations about positionality are not to be found exclusively here, though. I have woven them into and through the empirical-analytical chapters. Similarly, reflections on the processes involved in negotiating access, which happened multiple times during fieldwork, and the particular choices I made concerning, for instance, the path I would take in my follow-the-thing journey, are here given only perfunctorily; their main substance is kept for the corresponding point of their occurrence in the research narrative.

As an initial clarification, I should note that since the planning stage it had never been my intention to provide participants with any type of compensation for their collaboration in this study, and I have maintained that position throughout my fieldwork. I was concerned about the effect that monetising or incentivising our interaction could have on what participants would tell me. In particular, I feared that it could somehow lead them to distort what they had to share based on what they anticipated I would want to hear, which would inevitably be a failed guessing exercise. I must say, though, that on the whole I did not feel that participants expected to be paid, and neither do I think that money, or in fact any sort of

compensation, would have remedied the problems I faced in securing access on certain occasions. When interviewing waste pickers, though, I did make every effort to be helpful, joining them in their tasks as we talked, not only to create rapport, but fundamentally to avoid causing financial harm to them, since time equals vital money. I shall come back to that later on in this chapter. On my last day at the waste pickers' cooperative which became my gatekeeper in my first days in the field, besides being a place where I had spent over a month, I also offered them lunch, which I cooked myself in a sincere gesture of appreciation for their generosity in sharing their time, stories and knowledge with me. I also gifted certain waste pickers postcards from Edinburgh, which I had brought with me with that intention, knowing that they would probably be wondering what the city where I was studying was like – and they really appreciated this gesture. This was as far as I went in terms of remunerating research participants for their contribution.

Obtaining written informed consent represented a more challenging task and, although I had already anticipated this factor while completing the required research ethics form, I felt the need to review the standards I had set for myself. Signing a document represents a significant commitment in Brazil. When asked to sign a contract, people become suspicious of one's real intentions and often fear that they might be falling into a hidden word trick and agreeing to something that might be harmful to them. Being both Brazilian and a trained lawyer, I was particularly aware of this. I did ask for written consent in the early days of my fieldwork, but gave up on this strategy after noticing that the form was causing a lot of anxiety and speculation among the waste pickers. After signing the document, some of them came back to ask me questions about what exactly I was doing and why I needed a

written form. Although intended to be a helpful element in establishing trust between the researcher and participants by setting some ground rules about the use of data, the written consent form was serving the exact opposite purpose, making research participants doubt my true intentions. Besides, some of the waste pickers were illiterate, a condition which many are ashamed of. I could not know which individuals these were in advance, so by asking them to sign a form I could be exposing them to a stressful situation.

I also decided not to use a written consent form with the companies and government bodies with whom I interacted, for fear of the bureaucratic process I might be putting myself into, which again would most likely lead to a lot of suspicion and apprehension that I anticipated would be along the lines of "what is it that you will do with this data that you need me to sign a form?". Instead, I prioritised oral consent. When first approaching all participants, I would openly tell them that I was a PhD student carrying out research aimed at exploring and explaining how the PET recycling economy is organized in Brazil, with a view to improve waste pickers' position within it. I made sure to use plain and accessible language in my explanation, and did place a greater emphasis on the first part of it, concerning the recycling economy, which seemed more innocuous than a summary of the project in terms of wanting to "contribute to the empowerment of waste pickers". By making the aims of the research clear, and making myself available to answer questions, I was giving them the opportunity to make an informed decision about whether or not they wanted to take part, and also to assess and control the information they were willing to share, which is the ultimate purpose of the consent form.

There were some instances when I videotaped interviews and, in those cases, besides informing participants about the aims of the research, I recorded them giving me consent not only to use the data provided, but the recording of their image. The only instance when I did not present myself as a researcher or disclose the aims of the study was when I was added by a participant to a Whatsapp™ group for wholesalers and recyclers of PET. After careful consideration, I decided that identifying myself could alter the dynamics of the group, so I decided to silently observe their occasional interactions without engaging in conversations with anyone. I have now done so for about two years and, although I recall obtaining insightful information from the group only once, which in any case was not of a compromising nature, I do not identify any of its members in this thesis, since they were not aware I was observing them.

Due to the nature of the theoretical and methodological frameworks used in this thesis, particularly the use of space-time as a key element in the analysis and of follow-the-thing as a research method, anonymising participants was never part of the plan. In some cases, even if I did not provide their names, they would still be identifiable through their locations, and this type of identification was crucial to satisfactorily answering the research questions and pursuing the research aims. I was, however, more cautious with regard to waste pickers. Because they are in an underprivileged socioeconomic position and due to the social stigma attached to their profession, I considered it only fair to ask them if they wanted to be anonymised. I did not intend to expose them or cause them any harm, and in order to be faithful to that intention, in cases when I judged that their declarations were of a compromising nature or could negatively affect them, I made the discretionary choice not to

disclose their names or any other characteristics that could lead to them being identifiable, even if they did not request anonymity.

After thorough consideration, I decided not to take the same approach towards other research participants who were clearly in a position to make, by themselves, a full assessment of the consequences of their declarations. This involved mostly employees of public authorities and legal representatives of companies and sectoral organisations. In these cases, confidentiality was granted strictly when requested and, unlike with waste pickers, was not discretionarily provided in instances when I anticipated possible risks associated with identification. Due to the very nature of their work and the position they occupy, these high-level figures are expected to be well aware of the implications of their declarations and, therefore, did not need me to be mindful of their own interests, especially as they had been made aware of the scope and aims of the research. In any case, they were not exposed to the same risks to their livelihood as waste pickers in being identified. Finally, since some of these participants' more controversial and compromising declarations were key to understanding the configuration of the PET recycling economy and generating the kind of transformational knowledge that this thesis was designed to produce, I maintained my decision not to anonymise them unless specifically requested.

It is not only issues concerning the research participants that affected the unfolding of fieldwork, though. Working in the field requires researchers to conduct a self-reflexive contemplation concerning one's identities, actions, intentions, prejudices and feelings (Chacko 2004). Reflecting on my own positioning, I could see how the fact that I am Brazilian granted me certain advantages when negotiating

access and interacting with research participants for this study, for instance. I was familiar with the language, culture and social dynamics, and therefore I was able to start collecting data a lot more quickly than a foreigner would most likely have been able to, leapfrogging the adaptation/settling in phase. I had previously been to the Federal District three times to visit friends, and was somewhat familiar with its geography. All of these factors initially led me to think of myself as an 'insider' and of the 'field' as 'home'.

Nonetheless, the Federal District I knew was confined to *Plano Piloto*, satirically termed 'fantasy island' by many Brazilians because its socioeconomic indicators are not at all representative of the country's reality. When I made my previous visits to the region, between 2010 and 2013, I had no idea that a dumpsite – in fact the biggest then in operation in Brazil – sat 18km away from *Palácio do Planalto*, the president's workplace. My friends who lived in the Federal District were originally from my hometown and had moved there for work, as a lawyer and a civil servant of the Senate. That is to say, my social network was of very limited use in the establishment of contact with research participants and informants, despite being extremely helpful in entertaining me during my leisure time and easing the feeling of powerlessness that accompanied me in the field in face of a reality that I desperately wanted to change, but was conscious of my very limited capacity to do so. In this sense, I was probably as much an outsider as any foreigner, as I was entering a universe which, although so close to home, was as alien and unknown to me as a remote island in the Pacific. "I was simultaneously an insider, outsider, both and neither" (Sultana 2007:377).

I was both conscious and cautious of that duality, since I knew that positionality relates to aspects of identity that go well beyond nationality to cover "race, class, gender, caste, sexuality and other attributes that are markers of *relational* positions in society" (Chacko 2004:52 emphasis in original). These multiple – often disturbing – identities, which result from the changing permutations of the affiliations of both researchers and participants, interfere in the process of data collection and analysis (Chacko 2004) and should therefore be the object of careful consideration and reflection on the part of researchers.

In my attempts, while still in Edinburgh, to establish connections with people who could grant me access to waste pickers at *Lixão da Estrutural*, I liaised with a number of scholars and practitioners who were at the time involved in studies and projects commissioned by the Federal Government involving waste pickers in the Federal District. The Labour Party, which was in power from 2003 until 2016, when former president Dilma Rousseff was impeached, has a close relationship with the National Movement of Waste Pickers and paid particular attention to this professional category during its mandate. At the time of my fieldwork, a number of programmes were in place which aimed at building capacity, technically assisting waste pickers, and financing the acquisition of machinery and of basic infrastructure to foment the creation of cooperatives and networks of cooperatives. Nonetheless, the political conundrum which Brazil faced around that time, with a request for the impeachment of president Dilma Rousseff having been filed with the National Congress, meant that the continuity of these programmes was put to the test.

Two of my initial contacts, Julio Fontes, a consultant for the *Instituto de Estudos Socioeconômicos* (Institute for Socioeconomic Studies – INESC) and

Cristina Luttner, a consultant for the *Centro de Estudos e Apoio ao Desenvolvimento, Emprego e Cidadania* (Study and Support Centre for Development, Employment and Citizenship – CEADEC), were kind enough to facilitate my entrance into the field, sharing reports and introducing me to people who could help me initiate my journey and figure out the workings of the PET recycling economy in Brazil. Through Julio, I obtained the contact details of Cleusimar, the director of *Recicle a Vida*, a cooperative of waste pickers based in *Ceilândia*, one of the 31 administrative regions that compose the Federal District of Brazil. Julio told me that *Recicle a Vida* was a particularly interesting case because: (a) they are very well organised compared to other cooperatives based in the Federal District; (b) they had just been hired by SLU-DF to provide selective waste collection in a neighbourhood near their shed; and (c) their director, Cleusimar, was notably well-informed and receptive to talking to researchers.

Although I was not carrying out a quantitative study, and therefore was not looking for a sample that would be universally representative, I was aware that engaging with *Recicla a Vida* would give me access to a particular situation which was most likely different from the typical reality of cooperatives around the country, which often struggle with their internal organisation and do not commonly have connections with local authorities. In fact, waste pickers as a group are far from a monolithic professional category, and attempting to find a perfect, optimally adequate case study from which to depart in my fieldwork journey would run the risk of arbitrariness in my choice of criteria. Instead, I decided to follow Julio's suggestion and contacted Cleusimar, but kept in mind, as an element of reflection throughout my analysis, that *Recicle a Vida* was in a singular position. This led me to

commit to trying to understand, as far as possible, the reality of other cooperatives and waste pickers with whom I eventually came into contact, to the benefit of my own understanding of the broader working and functioning of the recycling economy.

After trying to contact Cleusimar by phone for over a week without success, I messaged him via Whatsapp™, without knowing that this messaging application is increasingly becoming the standard means of communication between traders in the PET recycling market in Brazil. With no more than a handful of words, he set a date and time for us to meet at the cooperative in *Ceilândia*. Initially, it was my plan to rent a room in *Ceilândia*, close to *Recicle a Vida*, as I was hoping to spend a month or so doing fieldwork at the cooperative, and being near its shed would make commuting easier. My friends who live in the Federal District, however, dissuaded me from staying there, arguing that *Ceilândia* was an extremely violent area, a no-go zone. I had no prior knowledge of *Ceilândia* with which to make my own informed judgement. Since criminality in Brazil is a huge issue – with a homicide rate of over 30 killings per 100,000 inhabitants in 2017, Brazil is among the top 20 most violent countries in the world (UNODC 2019) – I took their advice, and lodged in a room at *Plano Piloto* instead.

Planned in the 1950s and famous for the airplane shape of its built-up area, *Plano Piloto* is often mistaken for Brasília. In fact, for some time the administrative region now designated as *Plano Piloto* used to be called Brasília, but the latter term now technically designates the urban parts of the Federal District, despite the reluctance of even public authorities to correctly use the disambiguating nomenclature (see Figure 5, for instance, where region number 1, officially *Plano*

Piloto, is identified as Brasília). A UNESCO World Heritage Site since 1987, as an urban and architectural representation of Modernist ideals and principles, *Plano Piloto* houses the three branches of the Brazilian federal government – the National Congress, the Supreme Court, and the President's official workplace – as well as the main buildings of all ministries, integrating the inflated Brazilian bureaucracy, and the residences of some public servants and high-income individuals.

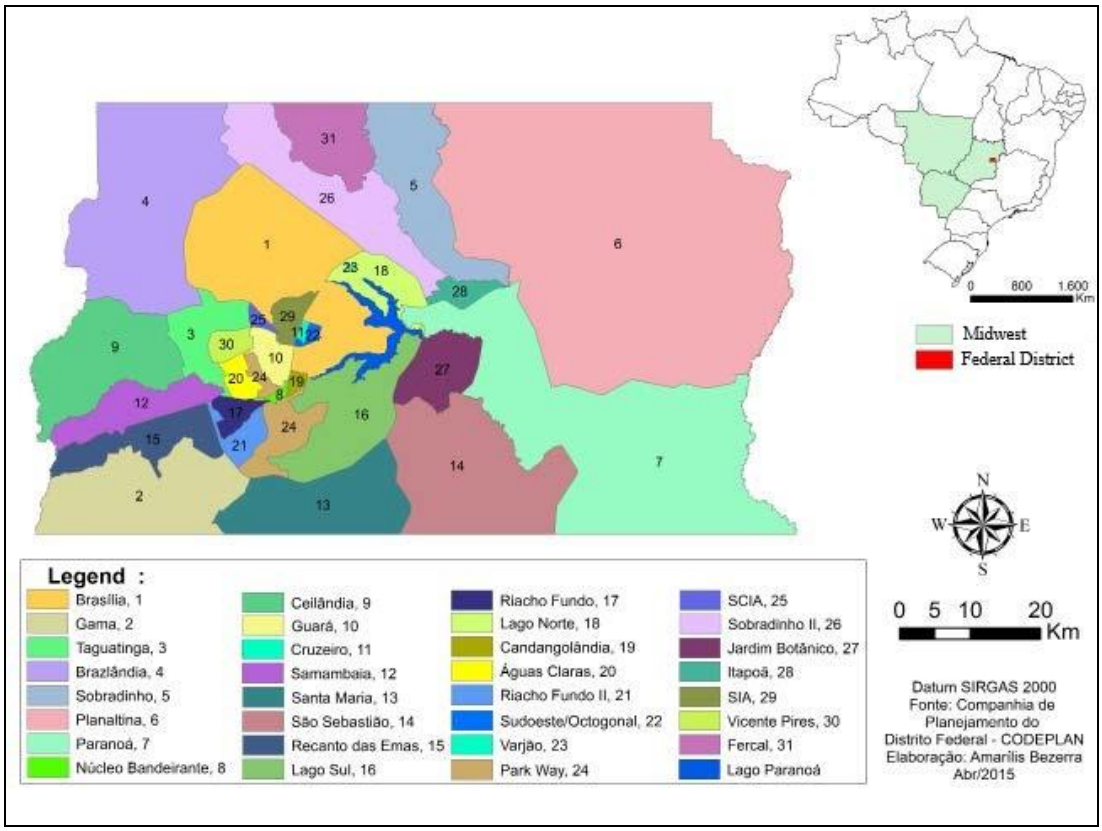


Figure 5. Administrative regions of the Federal District. Adapted from "Análise espacial dos fatores associados à realização de cesariana no Distrito Federal em 2009", by A. B. Bezerra, M. Santos da Silva, P. P. Alves da Silva et.al., 2015, Espaço e Geografia, 18(2):329-346.

Administrative regions other than *Plano Piloto*, such as *Ceilândia*, are commonly designated *cidades satélites*, or satellite cities, despite not having the legal or political status of towns. This belittling nomenclature alludes not only to the geographical layout of the administrative organisation of the Federal District, with

the so-called satellite cities surrounding *Plano Piloto*, but more tellingly to the fact that the everyday life of the residents of these satellite cities orbits the life and work of residents of *Plano Piloto*. Home to a mere 7% of the economically active population of the Federal District, *Plano Piloto* is the place of work of over 40% of its labour force (CODEPLAN, 2016a:91). If on a daily basis swathes of people commute into *Plano Piloto* to make a living, at least one thing flows just as frequently in the opposite direction: waste. And waste is precisely what I was tracing.

I was relying on public transport to get to *Ceilândia*, and Google Maps estimated that the journey would take one and a half hours. I knew that was over-optimistic, based on the overall unreliability of public transport systems around the country. Cleusimar had scheduled our meeting for 07:30am, so I left my room at 05:00am to make sure I would catch the first available bus to *Ceilândia* in order to be there on time. I did not see a single other person as I made my way to the bus stop at *Eixo Monumental*, a two-way road with 12 lanes which divides *Plano Piloto* into its south and north portions. Architecturally planned, *Plano Piloto* is divided into zones, each designated for one particular purpose, e.g. dwellings, banks, hospitals, hotels, clubs, and even car dealers. It has buildings scattered throughout its landscape, surrounded by vast open green areas, although they are not so green during the dry winter months, when the grass withers and the landscape becomes quite earthy. Hence, despite its flat topography, *Plano Piloto* is not a walking-friendly environment, with the distances between locations usually being quite long.

Given the affluence of the inhabitants of *Plano Piloto*, who tend to rely on privately owned cars as means of transport, I stood alone at the bus stop for close to an hour. In the distance I could see, on the opposite side of the road, the first few

buses entering *Plano Piloto* from other administrative regions. At that time of day, most interregional buses were heading into *Plano Piloto,* bringing workers. I was travelling in the counter flow; or at least I was hoping to. It took some time for the first bus to emerge over the horizon on the side of the road where I stood. This line was of no use to me, though. After waiting for one hour and forty minutes, a bus heading to *Ceilândia* finally arrived. It was nearly 07:00am and I would be at the very least one hour late for my first meeting in the field. I messaged Cleusimar apologising and telling him that I was on my way, but would probably not be there before 08:30am.

Although when riding public buses in Brazil I usually wish the drivers would slow down and drive more cautiously, on this one occasion I hoped he would go just a little faster. As the bus exited *Plano Piloto* and entered the highway leading towards *Ceilândia,* I could see nothing particularly attractive or engaging in the landscape, which made it hard for me to divert my attention away from the clock. During the hour and a half that I spent sat on that bus, I followed our progress live on my phone using Google Maps, and became immersed in my own thoughts. Glancing through the window, I observed as the roads became shabbier, walkways dirtier, buildings rougher and people more rustic as we entered *Taguatinga* and then *Ceilândia*, exposing why *Plano Piloto* is known as ‘fantasy island’. Such inequality between neighbouring areas is not a peculiarity of the Federal District, however, but rather a representation of the reality in many urban centres across the country. What makes it perhaps more shocking there is the proximity with the apparatus of government.

After three years living abroad in the United Kingdom, the socioeconomic discrepancy exposed on that bus route took on a different dimension. It is not the case that I was previously unaware of inequality and that being abroad had lifted a veil of ignorance, suddenly exposing it to me. Inequality has always caused me discomfort, but as part of my daily life growing up in Brazil, it used to have a component of naturalness, being something I deemed inevitable in any society. Living abroad made me look at it with different eyes; I do not hold an idealised view of the UK, as if there were no inequality there, but it could be argued that it is a more equal society than Brazil, in the sense that the gap between the very poor and the very rich is not as visible or as wide – the UK has a GINI coefficient of 0.33, compared to Brazil's 0.51, as of 2015 (The World Bank n.d.). Looking afresh at my own country after living abroad made me more critical. Inequality was not so normal anymore and, in fact, was a lot more painful to see.

Perhaps what had not been so clear to me before, and also what made the experience more disquieting, was that as part of that society I had played a role in the process of naturalising and reproducing inequality. Born into a middle class family, I always thought of inequality as something out there which opposed and contrasted the very rich and the poor, neither of which two categories I fit into. I had given money to charity and participated in campaigns to donate food and clothes to the poor, but that was pretty much just what was expected of me, or at least what I expected of myself, given my capabilities as a middle class young adult. Because inequality appeared so natural, I could overlook the interrelationship between my status and that of others who were worse-off than me (Kapoor 2004). I don't think that, prior to that moment, I had ever implicated myself in the process, or thought

about my share of responsibility and complicity in perpetuating inequality. It was as if coming back under a new guise, i.e. as a researcher, had made me more critical and conscious of my own position. Like Chacko, I felt that conducting fieldwork in my home country "required me to examine and reassess large areas of my life: my traits, my intentions, how I thought about myself and how I related to others" (2004:55). If indeed "one cannot do 'fieldwork' without first doing one's 'homework'" (Kapoor 2004:641), in the sense of scrutinising one's own position(s) before representing the Other, then I was off to a good start.

When the bus finally arrived at the stop where I was supposed to alight, I hopped off and strode towards the cooperative, using my phone as a compass. Despite the faded signboard, which made it hard for passers-by to discern the cooperative's name from the walkway, piles of bales of plastic bottles sitting in front of what looked like an old gymnasium left no doubt that I had arrived at *Recicle a Vida* (see Figure 6). The gate was open, so I made my way through.

Figure 6. *Recicle a Vida* front yard with bales of PET bottles ready to be sold. August 2016.

Cleusimar arrived half an hour later, and upon being told by the cooperative's secretary that I was waiting for him, greeted me by saying:

- *Julio has briefly told me about you, but what exactly is it that you are doing?*

Julio had made me aware that some waste pickers were tired of talking to researchers, given the constant requests for interviews in light of the numerous projects and programmes targeting them at that point in time. Despite his availability to meet me, I could tell from his tone that he was not very interested, perhaps thinking of me as 'yet another researcher' who wanted to learn from them. Keeping it brief, so as not to bore him, I told him I was studying abroad at the University of Edinburgh and summarised my research in a sentence, saying I was following PET

bottles to gain an understanding of the recycling market. Cleusimar was impressed by the mention of Edinburgh; "*Edinburgh you said, right?*" he inquired, visibly intrigued and excited by the fact that I was studying abroad.

However subtle, that was perhaps my first realisation of the prominent role that geographical space would play in my research. Edinburgh is most likely a lot farther away than Cleusimar will ever be able to travel. Some of the waste pickers I met during fieldwork had never even heard of it. In fact, one of them thought that there were only two countries on Earth: Brazil and the United States. I could tell that studying in Edinburgh made me special from Cleusimar's vantage point, and that made me uncomfortable; just one of the many instances in which working in the field made me confront my own privileges and positionality. I was aware that I could not erase the differences related to our positioning with regard to social class; it would not be "enough to try and effect oneself, to benevolently try and step down from one's position of authority", as this often results in "a reinforcement of privilege, not a disavowal of it" (Kapoor 2004:641). However, as Moser notes, research participants do not judge researchers based solely on their biographies – e.g. sex, age, gender, nationality, class – but also on their "unique individual social and emotional qualities – our personalities rather than our positionalities" (Moser 2008:383). Relying on my empathic and extroverted personality, I tried to bridge our positions by emphasising his achievements and showing him that I also perceived him as special:

- *Yes.* Recicle a Vida*'s reputation has reached the other side of the Atlantic. Julio told me you are one of the most organised and promising cooperatives in the Federal District. I came all the way here to know*

> *more about your work and would love if you allowed me to spend the next month or so shadowing and interviewing the cooperative members to get to know more about your daily routine and role in the PET recycling market.*

Cleusimar assented, granting me access to the cooperative, and took me for a tour around the premises as he told me *Recicla a Vida*'s story. Although I tried my best to minimise any feelings of inferiority that he might have had towards me, I still think that my unusual position, as a researcher from abroad – although Brazilian – exerted a sort of enchantment over him, providing me with better access. Not that he would have disallowed other researchers from carrying out their studies there, but he might have been less generous in terms of the time and information he would be willing to share were I from a local university. It also occurred to me later that being a woman might have had a bearing on Cleusimar's availability and generosity, for he seemed to be a ladies' man, and at times I had the feeling that he was trying to impress me.

As I planned my return to *Recicle a Vida* the next day, I felt unsure about how to approach potential research participants. As Sultana (2007:377) puts it, "the 'native' can be the 'other' through a class privilege", and I was aware of my dual status as both an insider and an outsider, and of the effects that this could have on my relationship with research participants. I made every effort to be conscious in my use of language, so as to avoid formal constructions and inaccessible expressions, as well as clothing, wearing basic jeans, t-shirts, sneakers and a canvas tote bag to be as inconspicuous as I possibly could. Reflexivity, however, involves reflection not only on one's visual appearance and behaviour, but equally on the research process. To

me, merely observing the workers, asking questions while they toiled or asking them to spare some time for us to talk, did not feel right, not least because of the politics of time entangled in such an approach. As Sultana (2007) asserts, researchers should be aware of their temporal positionality, which I understand as an invitation to appreciate the value of research participants' time, and to avoid inconveniencing them for the sake of our convenience as researchers, instead attempting to attend to their time preferences.

I wanted them to perceive me as a peer, to feel comfortable talking to me, and above all, I wanted them to know that I valued them and their work. The means I found to do this was to join them in their tasks, in order to demonstrate that to me their job was just as valuable and respectable as mine. By keeping myself open to emotionally connecting with them, I wanted to create a sense of mutual respect, drawing us closer through my social abilities instead of drawing us apart through social categories (Moser 2008). By doing what they were doing, I was not only generating rapport with them, but also engaging in genuine *participant* observation, collecting data and experiences that informed my research in new ways, as was the case with many of my findings regarding the materiality of PET bottles and other plastic containers, which will be the focus of subsections 7.2. and 10.1.

When I asked at the front desk if they had a spare pair of heavy duty gloves, the secretary gave me an incredulous look as she made her way to the cupboard to collect them, opening her eyes wide and furrowing her brow, as if asking me: 'you are not going to do what I think you are going to do, right?'. Holding the gloves, I went to the shed and asked Neuzinha, an elderly female sorter who was working near

four super sacks filled with Styrofoam and whom I met that day, if I could help her. She assented, and as I put on the gloves, she asked:

- *How many hours are you serving?*

I was not sure what she was talking about and assumed I had not understood what she said. Apologising, I asked her to repeat the question.

- *How many hours are you serving? You are here to do community service, right?*

It all became clear in a moment. The day before, as we toured *Recicle a Vida*'s shed, Cleusimar had told me that the cooperative had a partnership in place with the local court to serve as a community service centre for people convicted of misdemeanours. Neuzinha, then, assumed that I was there to do community service.

- *Oh… no. I am actually here because I am researching the PET recycling market. I want to understand how you process and trade PET bottles.*

As had the secretary, she seemed to find it hard to believe that by my own free will I would join her in sorting waste.

- *I have met many researchers but none of them has ever offered to help me do my work. They only ask questions.*

Neuzinha's remark exposed the power relations at play between researchers and participants, and revealed the importance of "being attentive to the politics of knowledge production" (Sultana 2007:376). After giving me instructions about what I should do, Neuzinha told me about her previous engagement with researchers. Her blunt statement was in the back of my mind as we chatted, and provided me with reassurance that my effort to blend in was worth it, while reinforcing that "the individual's personality plays a significant role in shaping power relations in all

social encounters, including that of the researcher and the researched" (Moser 2008:386). In terms of self-reflection it was not enough to focus "on how we are positioned vis à vis our research subjects with regards to race, religion, class, etc.", we must break the silence with regards to "how we as individual researchers behave and interact with research subjects who also have a range of social skills and emotional abilities" (Moser 2008:386).

6. TRACING BACKWARDS: *LIXÃO DA ESTRUTURAL*

Recicle a Vida presents itself as a waste *pickers'* cooperative; hence I assumed that its members, or at least some of them, would work at *Lixão da Estrutural* literally picking recyclables, since the dumpsite used to be the single final disposal facility for municipal solid waste in the Federal District. After spending a couple of days at the cooperative I learned that, although most of the recyclables which *Recicle a Vida* processes do indeed come from *Lixão da Estrutural*, none of its members actually work there; rather it buys recyclables from brokers working at the dump. My assumption about the cooperative being the first node in the revaluation process of discarded PET bottles was therefore wrong. In fact, as I later found out, the cooperative was the third stage in the chain of exchange relations that comprise the PET recycling network I was tracing. Hence, if I were to keep to my initial plan of following bottles from the point of being reclaimed at *Lixão da Estrutrural*, I would first have to trace the network inwards before advancing outwards.

This chapter follows this backwards movement, and is divided into four subsections. The first contains some considerations about reflexivity, particularly with regard to some practical decisions I had to make concerning access to the dump as a field and how that might have affected waste pickers' and dealers' perceptions of me. This reflexive exercise is interwoven with a rich sensorial description of my first encounter with *Lixão da Estrutural*, including my perceptions of the environment and the people I met there, as well as a brief biography and anatomy of the dump. Following this, I show how waste becomes entangled in political processes, arguing that agents involved in waste management and recycling develop

conflicting representations of waste underpinned by different ways of dealing with its materiality. Next, the different spatio-temporal practices of waste pickers and dealers at *Maciço* and *Coleta Seletiva* are compared and the impact of their differential access to space and mobility on their trading prospects are assessed. Finally, the reader will find a political-semiotic analysis of cooperatisation and formalisation where I argue for the importance of approaching these two courses of action in light of the social relations and the cultural context in which waste pickers are inserted as a pre-condition for identifying some of the issues surrounding their implementation.

6.1. "This dump is a no man's land': Perceptions of/in *Lixão da Estrutural*

Recicle a Vida became my workplace for over a month. I would go there almost daily, choosing a different person to help and observe each day. I would not spend the entire day there, though. Trying to become a part of the cooperative's routine, in order to familiarise myself with the dynamics of the recycling market – at least from their vantage point – I would also join *Recicle a Vida*'s drivers on some of their external work, which included multiple visits to *Lixão da Estrutural*. Members of the cooperative introduced me to people who became key informants, so in a way *Recicle a Vida* was my gatekeeper, paving the way for the research to progress. In this section, I will reflect upon how my connections with the cooperative might have affected my research, both opening up and closing down some opportunities for relationships and understanding through the fieldwork. These considerations are made as I describe my first encounter with *Lixão da Estrutural*. My first impressions of the dump have a bearing on my positionality, and are therefore well placed in this discussion.

6. Tracing backwards

One morning, as I helped the sorters at the conveyor belt (see Chapter 7 for more information on the internal organisation of *Recicle a Vida*), I heard Cláudia, the operational manager at *Recicle a Vida*, say that she was going to pay a visit to one of their partners at *Lixão da Estrutural* to negotiate an increase in the supply of mixed plastics. I asked if I could join her and she assented, glad to have the company. She drove an old, wrecked and noisy Volkswagen Kombi that had been donated to *Recicle a Vida* some years ago, and we talked about the cooperative and the recycling market along the way. We took a motorway heading to *Plano Piloto* and then entered *Cidade do Automóvel* – Automobile City, one of the planned zones of the Federal District dedicated to car dealerships. Abruptly, the promise of a cheerful and glamorous materialistic lifestyle, as epitomised in the smiles and worry-free faces of the people driving shiny new cars in the advertisements, the consumer dream of most Brazilians, gave way to disillusion as we entered *Vila Santa Luzia*, an informal settlement where most waste pickers working at *Lixão da Estrutural* live. Asphalt, cement and clean display windows were suddenly substituted for dirt roads, dust and shacks made of cardboard, debris and scrap.

The first people to settle there were attracted by the dump as a means of living. Since the 1990s, the unplanned settlement of *Vila Santa Luzia* has grown considerably, and now comprises over 3,700 households (CODEPLAN 2019:6). There is heavy truck traffic in the area. Kids and adults, with shirts wrapped around their faces to protect their noses and mouths from the dirt, ran alongside trucks heading to *Lixão da Estrutural*, trying to hold on to their trunks to hitch a ride. Uneven roads made it harder for them to grip as the trunks bounced and swayed. We crossed *Vila Santa Luzia* and reached an open area that announced we were at the

dumpsite's doorstep. There are no gates at the entrance, only a security cabin. The guard, however, does not control the inflow and outflow of vehicles and people. Drivers and pedestrians come in and out as they please. Nonetheless, Cláudia stopped to inform him where we were heading. He nodded in approval and we proceeded.

The story of *Lixão da Estrutural* intermingles with the story of Brasília. The Brazilian mid-west was mostly rural, with a low population density, until the transfer of the government apparatus from Rio de Janeiro to the newly planned capital in 1960. With the arrival of civil servants and their families, the challenges posed by urbanisation, including waste management, soon emerged. *Lixão da Estrutural* started out as an illegal disposal site for construction debris and scrap on a piece of wasteland belonging to *Terracap*, the Federal District's development agency. Poor workers who moved to the Federal District to help build it or hoping to get a job would scavenge there to complement their income and make ends meet. In the words of Gilmar, a waste picker whose father was allegedly the first person to ever pick waste in the area where *Lixão da Estrutural* now stands, "the dump was a hidden treasure". Soon supermarkets also started disposing of expired products there, attracting yet more scavengers, who would collect not only scraps to sell but food to consume, giving the area its nickname *Carrefa*, in reference to the French hypermarket chain Carrefour.

This practice endured until 2015, when the government issued a regulation determining that expired products must be destroyed before disposal in order to discourage waste pickers from consuming foodstuffs found in the dump. It is unclear from public documents when SLU-DF, the public body in charge of street sweeping

and solid waste management in the Federal District, started overseeing the site and using it as a disposal facility. The dump grew in size as the demographic density in Brasília increased and progressively became known as *Lixão da Estrutural*, meaning the big Estrutural dump, in reference to the highway that leads to it, called *Via Estrutural*. Bit by bit, other families moved to its vicinity, giving rise to *Vila Santa Luzia*, and made a means of living from the dumpsite, collecting not only recyclables there, but anything from clothes, shoes, toys and food, both for their own consumption and to sell.

Cláudia drove the Kombi at full speed through the dirt roads of the dump to keep pace with the trucks that were ahead of and behind us. The intense traffic of heavy vehicles and the dry wintery August weather stirred up dust, making it hard to breathe. Covering close to 200 hectares (about 280 football fields), *Lixão da Estrutural* is an enormous piece of land that, in its final years of operation, received roughly 2,500 tonnes/day of municipal solid waste and between 7,000-9,000 tonnes/day of construction waste (SLU-DF 2016). It was the workplace of over 1,800 waste pickers until 2017, when SLU-DF's plan to transition to the new sanitary landfill started to be implemented. At its entry, there is a weighbridge to weigh incoming tipper lorries, since a percentage of the payment due to waste management companies hired by SLU-DF is calculated on the basis of how much waste, in tonnes, they transport to *Lixão da Estrutural*. Nonetheless, SLU-DF leniently – and self-interestedly – agrees with the use of the weighbridge by traders in the recycling economy who have business with dealers and waste pickers at *Lixão da Estrutural*; after all, their business extends the dumpsite's lifecycle. Beside the weighbridge, there are two buildings to host the SLU-DF administrative staff working at *Lixão da*

Estrutural and containing basic infrastructure, such as a kitchen and bathroom, to serve the ground staff working around the dump.

There are two tipping areas. The first, located within walking distance of the weighbridge, is *Coleta Seletiva*, literally meaning selective collection, where only dedicated trucks responsible for collecting source-segregated waste – i.e. dry recyclables – from certain neighbourhoods can tip waste; not all neighbourhoods are covered by this service. Moving deeper into the dump, one finds the second and largest tipping area: *Maciço*, meaning solid, where unsorted household and commercial waste – and therefore the vast majority of the waste collected in the Federal District – is tipped and buried (see Figure 7).

Figure 7. Satellite image of *Lixão da Estrutural* (blue contour), officially known as *Aterro Controlado do Jóquei*, with its internal areas *Coleta Seletiva* (in yellow) and *Maciço* (in red) graphically demarcated. Retrieved from Google Maps, 2019 [*https://goo.gl/maps/R9uVmFQHzt12*]

The smell of decomposing matter got worse as we headed towards *Maciço*: an incredibly large plateau consisting of a mixture of waste and soil with big concrete pipes scattered around the landscape, surfacing from the ground, from which methane and other gases released in the decomposition of organic matter found in waste escape into the atmosphere. Hundreds of waste pickers toiling around trucks, bulldozers, steamrollers and some huts made out of pallets, crates and tarpaulin completed the scenario. Like Millar (2018), my first impression was that the hectic uncoordinated movement of heavy vehicles and people tipping, pushing, compacting and picking waste was the epitome of chaos. Over the course of my multiple returns to the dump, however, I was able to appreciate the existence of a tenuous and fragile harmony between the various agents for whom *Lixão da Estrutual* was a working environment, a place they returned to daily. Waste pickers, truck drivers, machine operators and security guards seemed to have developed their own tacit code of conduct and had a sense of when they could move forward or reverse, or when they were expected to give way or get out of the way. Vehicles always had priority and, although things worked fine most of the time, accidents, mainly people being run over, did happen every once in a while alongside numerous near misses; hence my characterisation of this harmony as fragile.

Cláudia left the road and started driving over the waste in the direction of some cars parked nearby, taking care to follow the tire tracks left by trucks to avoid getting bogged down in muddy waste. Holding her mobile phone with one hand and the steering wheel with the other, she kept on driving slowly as she called Cláudia do Beleléu, the broker we were looking for. From a distance, behind some super sacks

used to store recyclables and near other waste pickers, I could see someone waving in our direction. They made eye contact and Cláudia waved back in reply, hanging up the phone. She parked the Kombi and we started walking towards the area where Cláudia do Beleléu stood. It took me a second to realise it would be worthless to try and scan the ground as I walked to pick the safer spots to step on. Pacing fast to stay close to Cláudia, I fanned myself with my hand, trying to get rid of the numerous flies that buzzed all around, agitated by the heavy wind.

Despite the noisy and frantic environment, my impression was that everybody around us took note of our arrival, diverting their attention from their tasks to look at us, even if briefly. I felt as if people were inspecting us with a mixture of suspicion, curiosity, and hostility. I did not anticipate being so conspicuous, wearing jeans, an old promotional t-shirt and threadbare sneakers, all chosen precisely to be as unnoticeable as possible. Looking back, however, I think that these initial feelings came more from my side than from theirs. I was the one entering an unknown environment and therefore feeling insecure and uneasy. If they glanced at me, most likely it was not with any inquiring or threatening intention; they were just doing as they do with everyone around them.

Cláudia do Beleléu was in the company of two other women and a man: her husband Antonilson, nicknamed Beleléu, which explains her own nickname. The group gathered under a sunshade and around a cool-box, using crates as seats. One of the women peeled an orange and started eating it, whilst the other poured coffee into a mug. Cláudia from *Recicle a Vida* greeted everyone and introduced me, saying that I was carrying out research. To my relief, the group was quite receptive and friendly, although at this first encounter I preferred to observe and listen rather than talk. The

Cláudias talked openly and seemed to maintain a healthy business relationship. They engaged in some small talk before moving on to discuss a new schedule of collection to accommodate an increase in the weekly supply of mixed plastics as required by *Recicle a Vida*.

The cooperative has two other suppliers of mixed plastics at *Lixão da Estrutural*, Fábio and Zezinho, who work together and are based in another area of the dump: *Coleta Seletiva*, where source-segregated waste is tipped. However, employees of the company hired to provide selective waste collection were on strike and, consequently, Fábio and Zezinho were currently unable to meet *Recicle a Vida*'s demand. Cláudia had resorted to contacting her namesake to make up for the supply shortage. The cooperative used to have another supplier based at *Maciço*, Pintinho, but stopped doing business with him after he bought materials from fellow waste pickers to resell to *Recicle a Vida* and then failed to pay them. Despite having received his due payment from *Recicle a Vida*, according to Cláudia, Pintinho told the waste pickers he had not been paid. The waste pickers started calling the cooperative to complain and found out Pintinho was lying. When the truth emerged, Pintinho vanished, only to return some months later to pick waste at the dump having lost his credibility as a broker.

As the Cláudias talked, two male teenagers called Cláudia do Beleléu from afar. She replied saying she was busy, but they came to speak to her, interrupting the negotiation. They wanted Cláudia do Beleléu to show them the pictures of the deceased body of a 12-year-old girl who had been raped and murdered the day before at *Lixão da Estrutural*. The pictures had been circulated via Whatsapp™ by waste pickers who found the body, and Cláudia do Beleléu had received them. One of the

teenagers feared the girl was his cousin and was seeking reassurance through looking at the photos. Cláudia do Beleléu's mobile phone was circulated amongst the group standing by the sunshade, as they discussed details of the state in which the deceased's body was found, putting the boy's mind at rest by telling him she was not his cousin. Cláudia from *Recicle a Vida* saw the pictures and handed me the phone with a disgusted expression, but I refused to look, giving a shake of the head. *Lixão da Estrutural* had already provided me with an avalanche of sensorial stimuli, so I spared myself of that sorrowful visual memory; hearing the story was distressing enough. I waited for Cláudia from *Recicle a Vida* as I listened to Cláudia do Beleléu make her final remarks about the girl's tragedy:

- *I have seen her scavenging around here a couple of times. People are saying she was smoking crack in the dump during the night. This dump is a no man's land… especially during the night.*

When Cláudia from *Recicle a Vida* said her goodbyes, I asked Cláudia do Beleléu if I could return another day to have a chat with her about my research. She assented and I thanked her, promising to return soon. The hostility I initially felt from the looks of some of the waste pickers at *Maciço*, and which I now wonder whether it was imagined or factual, coupled with the tragic story of the murdered girl and my overall perception of safety after visiting *Lixão da Estrutural* on that day discouraged me from returning there by myself, however. Even if I wanted to, it would not be easy to get there, as it is inaccessible by public transport and I did not have a car in Brasília, and did not think renting one would be worth the cost. To go there alone I would have to take a bus to *Estrutural* and cross *Vila Santa Luzia* on foot, but I did not feel at ease doing that. On top of that, I was advised not to return to

Lixão da Estrutural by myself, when I sought permission to return to the dump to carry out research.

After my first encounter with *Lixão da Estrutural*, I contacted SLU-DF to inform them of my wish to interview waste pickers at the dump and to ask about any procedures I needed to follow. The attendant asked me to fill a form with information about the research and advised me to phone Galego, a member of SLU-DF staff who has been working at *Lixão da Estrutural* for over 30 years, to schedule a visit, which I did. On the date agreed, I joined Abidias, one of *Recicle a Vida*'s drivers, as he headed to *Lixão da Estrutural* to collect recyclables from Cláudia do Beleléu. Upon entering the dump, Abidias drove to the weighbridge located near the administrative office of SLU. Following his usual protocol, Abidias queued behind other trucks that were waiting to be weighed. Every time he would go to the dump to collect materials he would weigh the truck upon arrival and before loading to determine its tare weight, and then again once loaded and before leaving the dump to calculate the payment due to suppliers (see Figure 8).

Figure 8. *Recicle a Vida*'s cage truck at *Lixão da Estrutural* weighbridge. September 2016.

As Abidias waited in line, I alighted to look for Galego at SLU-DF's administrative office. I thought the purpose of scheduling a visit was a mere formality, assuming I would be required to sign a guestbook and watch a safety video at most. To my surprise, Galego was ready to escort me. He seemed to be in a hurry and addressed me hastily:

- *Do you know where you are going?*
- *Yes. I will meet Cláudia.*
- *Are you in your car?*
- *No. I am with that truck – I said, pointing to* Recicle a Vida's *cage truck then leaving the weighbridge.*

- *Ok. I will meet you there then. I will be in this vehicle* – he said, entering a Fiat Uno in the company of a man wearing green uniform, a member of staff of the company hired to manage *Lixão da Estrutural*.

He quickly started the engine and left, stirring up dust. I had no time to ask if his escorting me was really necessary. I did not know if Galego was loved or hated by waste pickers and dealers at *Lixão da Estrutural* and I feared that being associated with him could have a negative impact on my research. I returned to the truck wishing I had not followed the protocol and had just joined Abidias without asking for SLU-DF's permission to carry out research at the dump.

As we reached *Maciço*, Abidias started looking for Cláudia do Beleléu's car, a white Fiat Palio. He told me she always parks her car near the place where her super sacks with recyclables are. Cláudia saw us as Abidias parked the cage truck. She called Beleléu to help load *Recicle a Vida*'s truck. I remained inside the cabin, trying to spot Galego from the top. I imagined he would already be there as he had left before us, but I could not see him anywhere. As I alighted, he phoned me:

- *Where are you?*
- *I am with Cláudia, but I cannot see you.*
- *Which Cláudia?*

Back then, I did not know how Cláudia do Beleléu was generally known, so I said I was with "Cláudia from *Maciço*".

- *Oh... I thought you meant another Cláudia. Do you want me to go there?*

I was pleased he asked. I did not really feel the need to have him escorting me and neither did I anticipate his presence being beneficial to my data collection process, not least because, as a staff member of SLU-DF, Galego could create an

undue pressure on waste pickers to participate in the research by believing that it was somehow mandatory.

- *Well, if I have the choice I would say that it is not needed. If you do not mind, I will contact you later for us to have a chat another day.*
- *Okay, just do not stay there [at Maciço] on your own.*

I was not sure on what basis he was warning me or what dangers he was implying. I knew that alcoholism and drug abuse were common among waste pickers at *Lixão da Estrutural*, some of whom later described alcohol and drugs as both a means of coping with the harsh environment of the dump and escaping from their tough reality. I also knew that crimes were often perpetrated at the dump and a heinous offence had just been perpetrated a couple of days previously. I assumed Galego's warning was based on these facts. In any case, I was ready to take his advice, which was in line with my overall initial perception of safety at the dump – although the more I went there, the more I questioned whether my first impressions were misjudgements based on my positionality.

My best bet was to rely on *Recicle a Vida* to take me to *Lixão da Estrutural*. I would go to *Recicle a Vida* almost daily during nearly two months between August and September 2016, and joined the cooperative's drivers on several of their trips to *Lixão da Estrutural* to collect materials, just as I had done with Cláudia and Abidias. I would talk to waste pickers and brokers nearby as *Recicle a Vida*'s truck was loaded. Being with them gave me the reassurance I needed to feel safe carrying out my research. It also made my life a lot easier, not only in terms of logistics but also in terms of gaining access. Arriving on a recycling truck made me less noticeable and more a part of the daily routine of waste pickers and brokers working at *Lixão da*

Estrutural. I was open to blending in and taking the advice of some friendly female waste pickers, who were concerned about my hair becoming dry due to exposure to the dense dust of the dump and recommended I wrapped a T-shirt around my face, as they do when they are not wearing a hat or bonnet, which helped me to create a rapport with them.

On the other hand, although I would always make clear that I was an independent researcher, and would try to approach them when they were either alone or in smaller groups and sufficiently far from *Recicle a Vida*'s drivers not to be overheard, I might not have been able to completely avoid being associated with the cooperative. My impression was that all waste pickers and brokers with whom I spoke at *Lixão da Estrutural* were being frank and spontaneous, and although I did not notice any instances when they appeared to be evasive or concealing information for fear of connections between myself and the cooperative, not least because *Recicle a Vida* seemed to maintain a friendly relationship with its suppliers at *Lixão da Estrutural*, I must acknowledge and take into consideration the possibility that arriving with the cooperative's truck for all of my visits might have affected the information I was able to access. Nonetheless, I was ready to accept that potential pitfall in light of the greater advantages I saw in relying on *Recicle a Vida* as a gatekeeper at *Lixão da Estrutural*.

6.2. "There is not enough waste for everyone": The political life of waste

I spoke with Cláudia do Beleléu on several occasions, all of them when accompanying Abidias to collect recyclables at the dump. Cláudia do Beleléu is a registered member of *Ambiente*, one of the six cooperatives based at *Coleta Seletiva*,

the area of the dump where source-segregated waste is tipped – at least theoretically, since some householders do not sort their waste properly. *Ambiente* has over a thousand members (SLU-DF 2016:53) and, as one of them, Cláudia do Beleléu had the right to reclaim recyclables in the area allocated to the cooperative at *Coleta Seletiva*. Initially assuming that the allocation process could have triggered some discontentment among members of those cooperatives which were not granted the right to pick at *Coleta Seletiva*, I asked waste pickers as well as members of SLU-DF staff about how the selected cooperatives had been chosen. Although none of them were able to provide me with information about the allocation process, this proved to be unimportant. As fieldwork progressed, I discovered that *Maciço*, the designated area for the disposal of unsorted waste, is the general preference among waste pickers, despite the comparatively better quality of materials found at *Coleta Seletiva*. How could this be the case?

This section aims to confront this question, drawing "[a]ttention to the materialities of waste [a]s critical to understanding both how specific waste economies are governed, but also how specific materials can or cannot be rendered valuable within specific supply chains" (Millington and Lawhon 2018:11). First, I will present recycling "not only [as] a process of adding value up the chain, but also [as] a process of value extraction (…) linked to the material properties of end-of-life goods" (Crang et al. 2013:13). I will then examine how the way the waste management system is structured in the Federal District ignores the materiality of waste and thereby challenges recycling as a process. The clash between waste pickers' struggle to "reinscribe waste with value" (Millington and Lawhon 2018:11), recovering its 'resource-ness', and SLU's cost-reduction approach towards waste

management serves as the background for a reflection on the political life of waste as it comes to embody the interests of one group at the expense of jeopardising the interests of the other.

"Resources are not: they become" (Zimmerman apud Bridge 2009), and this process of becoming is fundamentally a process of abstraction, i.e. of homogenisation and standardisation on both the material and conceptual levels, aiming at the exchangeability and fungibility of resources in local and global markets (Richardson and Weszkalnys 2014). Indeed, markets are "particular relational enactment[s] of materiality" that "produc[e] a version of matter by making some aspects of it present and excluding others, by seeking to establish singularity out of material multiplicity" (Hawkins 2011a:2003). Recycling, as a market, is based on such a process of abstraction, i.e. on "transform[ing] estimated and animate multiples (end-of-life things) into stabilized goods (plural), that is, materials that can be traded in markets" (Gregson et al. 2013:8–9).

Nonetheless, things are dynamic and "carry with them a margin of indeterminacy" which represents risks in the form of "a future that we cannot fully appropriate" (Braun and Whatmore 2010:xxi), and which become all the more pressing in the case of recycling. "This is not only because things and materials become animated in these activities, making multiple suggestions as to what they might be, or become, as a tradable good (…), but also because socio-technical devices (…) struggle to stabilize a process that is open in its possibilities" (Gregson et al. 2013:8). Thinking specifically about recyclables contained in domestic solid waste, these risks, which are intrinsic to secondary materials, include not only the hazards posed by eventual residues resulting from recycling activities, but

fundamentally the threat of contamination and poor quality that accrue from a failed process of abstraction. The dangers presented by the materiality of wastes, therefore, are not limited to those instances when these are externalised by and from the economy, and threaten the environment, for instance; rather, they can also be felt when waste insists on circulating within and resists leaving the economy. “If incorporated into the supply chain, poor-quality materials will threaten the tradability of the primary good and the reputation of that manufacturer. This signals a broader point: that secondary resource recovery, while technically possible, is always a socio-technical project” (Gregson et al. 2013:8).

To prevent and mitigate the risks associated with the recalcitrance of matter, the technologies, attitudes and behaviours that constitute recycling as a socio-technical project should be guided by the abstraction process taken as a principle. In more concrete terms, again focusing on domestic solid waste, once products are consumed, their respective packaging should be source-segregated, if recyclable, so as to reduce the harm caused by contamination and easing instead of complicating the unfolding of recycling as a process. Nonetheless, this is not the logic underpinning the waste management system in the Federal District.

Out of the roughly 2,600 tonnes of domestic solid waste collected daily in the Federal District in 2016, only 5.9% were selectively collected (SLU-DF 2017), i.e. picked up by dedicated trucks responsible for collecting dry recyclables in certain neighbourhoods. Unsorted waste collection, which corresponds to the other 94.1%, costs the government of the Federal District R$ 90.60 (USD 23.60) per tonne, whereas selective collection of source-segregated recyclables costs more than double that amount, at R$ 182.60 (USD 47.55) per tonne (SLU-DF 2017). Since SLU-DF

relies on cooperatives of waste pickers to further process and sort the waste which has been selectively collected – instead of processing it itself – it does not gain any revenue from the sale of recyclables to offset the costs incurred in selective waste collection. Even if the operational costs of managing *Lixão da Estrutural* are included – around R$ 23.50 (USD 6.12) per tonne dumped – conventional unsorted waste collection remains considerably more (financially) attractive in the kind of short-term cost-oriented evaluation that usually guides decision-making in the Brazilian public sector.

In fact, after a change in government in the Federal District due to 2015's Brazilian gubernatorial elections, SLU-DF, the public body in charge of waste management, reformulated its strategy and severely reduced the scope of the existing recycling scheme. The new governor inherited a huge fiscal deficit from his predecessor, and the order of the day was to cut expenses. Based on a gravimetric analysis of waste arising from the 31 administrative regions, SLU-DF identified those with the highest concentration of recyclables and devised a new differentiated collection system that, according to SLU-DF's director, Heliana Kátia, was attentive to distinct local realities and aimed to rationalise the provision of waste management services, making them more cost-efficient. Whereas unsorted waste collection was maintained in all administrative regions, only the better off and more densely populated regions were covered by selective waste collection of dry recyclables.

Setting aside discussions about the fairness of SLU-DF's reformulated waste management strategy from the perspective of citizens, I would like to concentrate on other political implications of SLU-DF's decision to reduce the provision of selective waste collection and focus instead on unsorted waste

collection. First, it should be noted that this decision is the main driver behind waste pickers' preference for working at *Maciço*, because it means that waste is more abundantly available there than at *Coleta Seletiva* and, therefore, waste pickers have a better chance of reclaiming more recyclables and thus making more money at *Maciço*. Furthermore, it is imperative to bring to light that the kind of cost-benefit analysis that guides SLU-DF's actions is fundamentally grounded upon the externalisation of costs related to dealing with the materiality of waste once disposed. Here I am particularly interested in the unpaid labour of waste pickers, who in salvaging materials from the dumpsite help to extend its lifecycle and, thus, to mitigate the negative effects of SLU-DF's short-sighted approach towards waste management. In other words, it is only cheaper for SLU-DF to provide unsorted instead of selective waste collection because, among other things, it can rely on unpaid labour by waste pickers to carry out sorting and recycling. Furthermore, SLU-DF's cost contingency measures create antagonism between waste pickers while exposing some of them to avoidable risks, as I shall argue next.

According to Cláudia do Beleléu, "competition for materials is fierce at *Coleta Seletiva* as a result of too little waste being tipped there compared to here [at *Maciço*]". Out of over a thousand members of *Ambiente*, for instance, only around 30 work at *Coleta Seletiva*, across different shifts. Juliana is one of them. She picks waste alongside her husband, Nildo, and corroborates Cláudia do Beleléu's perspective on the scarcity of waste and strength of competition at *Coleta Seletiva*, even amongst members of the same cooperative: "if they [members of *Ambiente* working at *Maciço*] decided to come here [to *Coleta Seletiva*], we would have to fight because there is not enough waste for everyone", declared Juliana, adding that

"we are all friends here, but only until the trucks arrive. Then competition starts. It is as if the devil came in the load to disseminate quarrels". Juliana and Nildo even devised a strategy to maximize retrieval of materials and mitigate competition. They reclaim mixed recyclables in a single bag to optimise the time they spend rummaging through waste, and refine their sorting later, once there are no recyclables left in the tipping area.

Still, Juliana preferred to stay at *Coleta Seletiva*. Her reasons are related to the materiality of waste. Four months pregnant at the time I interviewed her, Juliana expressed concern with the gas leaking from the pipes emerging from the ground and scattered around *Maciço*: "We do not know what that gas contains. Sometimes it just starts burning spontaneously", observed Juliana, suggesting that the gas might be toxic. The gas in question, composed mostly of methane, and therefore highly flammable and with a strong greenhouse effect, is produced by anaerobic bacteria in the process of decomposing organic matter, but can also result from chemical reactions between materials found in unsorted waste. Because waste tipped at *Coleta Seletiva* is source-segregated, at least most of it – since waste pickers recurrently report finding organic matter mixed with recyclables in waste bags collected by selective waste collection trucks – and since it is not a final disposal area, unlike *Maciço*, there are no such pipes there. This is not to say that *Coleta Seletiva* is free from these fumes, but only that they are considerably less intense there when compared to *Maciço*, to the point of instilling in some waste pickers a perception of safety. The materiality of these gases, therefore, is a point of concern for some waste pickers and influences their choice of working environment, with further implications for their trading prospects, including choice of buyers, price of

recyclables and terms and conditions of sale, as will be elaborated upon in subsection 6.3, where I discuss spatio-temporal practices at *Lixão da Estrutural*.

Besides the tensions it creates among waste pickers and the risks it brings to their lives, the effects of SLU-DF's choice to treat waste not as an economic possibility, but as a stubborn fact (Gregson et al. 2013) that should be dealt with through a cost-benefit analysis that accounts mostly, if not solely, for immediate and direct costs, are felt throughout the recycling network. Many times during the course of this investigation, the vital materiality of waste, neglected by SLU-DF cost-reduction strategies, made itself felt through pressures exerted over the configuration of the PET recycling network and the responses it elicited from agents partaking in it. The unfolding consequences of this short-sighted approach towards waste management, irresponsibly privileging disposal over recycling, are very often not restricted to market players in the recycling economy, extending into the wider population and outlasting the mandates (and even the lifespans) of public officials.

Such consequences are aggravated by the logistics of waste collection implemented by SLU-DF, underpinned by the same logic of reducing the budgetary impact of waste management. In previous mandates, the public body created five transhipment stations located across the Federal District (SLU-DF 2016), following a strategy commonly adopted by large urban centres to reduce the transport costs associated with waste management. Under such a logistical arrangement, the unsorted waste collected by small and medium-sized compactor trucks, with the capacity to carry between 6-13 tonnes of waste, is taken to the nearest transhipment station where it is transferred to bigger tipper lorries, which carry on average 25 tonnes of waste per trip, and then take it to *Lixão da Estrutural* to be disposed of.

I visited one of these stations, located in the administrative region of *Sobradinho*. Compactor trucks are constantly arriving there, tipping waste onto a ramp where waste pickers stand carrying out their sorting tasks. They have very little time to look for recyclables between waste being tipped out by the compactor trucks and reloaded into tipper lorries heading to *Lixão da Estrutural*, which means that the waste that gets to the dump is filled with recyclables, as Cláudia do Beleléu assured me, despite scavenging also taking place before collection from the public dumspters by waste pickers who work within the city. Hence, waste pickers at the transhipment station in *Sobradinho* hurriedly start reaching out for waste bags as soon as the back door of the compactor trucks is opened, and continue rummaging as the front end of the truck body tilts and the waste slides out onto the ground. Once emptied, the compactor trucks leave the transhipment station to collect more waste, making way for incoming trucks. Every so often a bulldozer comes to rotate the heaped pile and progressively clear the ramp, pushing waste into a deep trench at the bottom of which a tipper lorry with an open box bed is parked waiting to be loaded. Once full, the tipper lorry departs for *Lixão da Estrutural*. There were 4 tipper lorries serving the transhipment station at *Sobradinho*, and they made between 3 and 4 trips each per day to *Lixão da Estrutural*.

The multiple processes to which waste is subjected between being disposed of by householders and reaching *Lixão da Estrutural*, i.e. bagging, collecting, compacting, tipping, rummaging, revolving, pushing, loading and tipping again, impair the quality of recyclables, often posing a challenge to the abstraction process which is intrinsic to recycling. Interaction becomes interference (Hawkins 2011a) as what were once immaculately clean PET bottles filled with crystalline water and soft

drinks, for instance, become muddy, dirty, greasy pieces of plastic, and this certainly has consequences for recycling. Indeed, the co-existence of recyclables and contaminant matter, e.g. organic waste, in waste bags, and the latter's eventual resistance to leave the assemblage that results in recyclables becoming resources again, elicits reactions from actors partaking in the recycling network. *Capital Recicláveis*, the biggest wholesaler of recyclables in the Federal District, and particularly strong in the cardboard market, for instance, does not buy PET bottles reclaimed at *Lixão da Estrutural*, even from *Coleta Seletiva*. According to the company owner, Jair, "PET bottles recovered at the dump are too dirty and the industry complains about it".

The enduring materiality of waste not only obstructs certain conduits through which recyclables could potentially flow, it also affects the political balance between players in the recycling economy. Cláudia do Beleléu reports that buyers apply unilateral discounts when the level of contaminants found in any given load is deemed to be unacceptable. This can be a cause for conflict at times, if brokers think that the discount is unfair, either because it is based on false allegations from the buyer or because it is too big. Any type of non-recyclable matter is considered a contaminant in this context, with some buyers being more stringent than others. These findings were particularly interesting because, when I initially considered using Cultural Political Economy as a theoretical framework and examining the material dimension of the PET recycling economy in Brazil, I was mainly considering how the materiality of PET bottles itself affected the configuration of the recycling network and, hence, waste pickers' position in it. It turns out, however, that the materiality of remnants of other materials with which PET came into contact

while they coexisted as unsorted municipal waste, mostly organic compounds, also had an impact on the recycling process and, consequently, on waste pickers' prospects of socioeconomic empowerment.

SLU/DF is not the only party to be blamed for these imbalances, though. It has in fact been left to deal with a problem created by companies when using PET bottles and other packaging materials as marketing devices to make their products available to consumers around the globe, without caring or taking responsibility for their afterlives. "Packaging has been central to the development of markets and the reordering of relations between products and consumers" (Hawkins 2011b:545–46). Packaging, however, has a life of its own, which does not finish when the products reach consumer markets and the companies' profit generating goal has been achieved. Nonetheless, very few producers, as of yet, take responsibility for the reverse logistics of their packaging, instead preferring to supress its immanent future as rubbish, inscribed in its very materiality (Hawkins 2009), perpetuating an unsustainable linear economic model that SLU-DF helps to consolidate with its waste management practices.

What these dynamics reveal is that waste items are not passive objects; they have a peculiar existence marked by their capacity to assert themselves independently of their imbrication with human subjectivity (Bennett 2010b; Hawkins 2011b). Their thingness transforms waste into a contentious object to which multiple and conflicting representations and meanings are ascribed. "When we inquire into the representation of waste, we are asking which side of key dichotomies waste has been identified with, how and why waste's materiality has been misunderstood, and with what consequences" (Gille 2010:1056). As SLU-DF's view of waste as a

stubborn fact, based on a complete neglect of its materiality after disposal, prevails over waste pickers' perception of waste as an economic possibility opened up through recycling, its political life is made explicit. As waste comes to incarnate SLU-DF's cost reduction priority, its recyclability is put to the test as it is caught up in an exploitative socio-political relation to the detriment of waste pickers. "Recycling challenges the externalization of waste, be that via economic modelling or through physical processes" and therefore demands "a reflexive intervention in the organization of markets, one which extends the boundaries of markets by paying attention to the career of goods" (Gregson et al. 2013:7).

6.3. "They go make profit in hell": Spatio-temporal practices, (im)mobilities and material constraints

The existence of two streams of waste arriving at *Lixão da Estrutural* – i.e. unsorted and selectively collected – creates an interesting spatial dynamic at the dump. As previously mentioned, it is divided into two main areas, *Maciço* and *Coleta Seletiva*, each with its own unique spatio-temporal-material reality. As will become clear in this section, based on a comparison between the spatio-temporal practices of waste pickers in these two tipping areas, space-time is constitutive of the social world and can significantly advance our understanding of it, despite often being treated as a background of empirical relevance but no theoretical purchase (Castree 2009). By spatio-temporal practices, I am referring to the "space-related manners of behaviour, that is, the everyday practice supported by routines and routes by which spaces are produced and reproduced" (Löw 2016:112), and the temporality which is engendered in them. Waste pickers' differential access to space and to the

means of transposing it subjects them to a certain temporality that affects the valuation processes and the power of waste pickers vis-à-vis other players in the recycling economy.

Lixão da Estrutural is open 24 hours a day. Waste pickers can be seen working there day and night. *Maciço* is the biggest and the most dangerous area of the dump, according to Galego, a member of the SLU staff. Precisely because it is so big, it is hard to monitor what happens there and to maintain internal organisation, especially when there is barely any control over who enters the dump. There is no demarcation of workspace, and anyone can start reclaiming recyclables anywhere within the site, making it easy to understand why many waste pickers refer to *Maciço* as a "no man's land". Generally, waste pickers working at *Maciço* specialise in reclaiming either cardboard or mixed plastics, the two recyclables most easily found in waste streams. These are traded separately due to price differences, cardboard being considerably cheaper. PET is by far the most abundantly available type of plastic, being twice as prevalent as HDPE, the second most numerous. The classification of plastics according to type is fundamental to the recycling process (see subsections 7.2 and 10.1); nonetheless, waste pickers working at *Maciço* do not usually sort them. As will be discussed in this section, the unavailability of space to store recyclables means that, as a rule, waste pickers and dealers operating in the area sell plastics mixed and loose. Thus, although my research is specifically targeted at PET, at *Maciço* I had to trace plastics in general.

With one medium-sized plastic bag wrapped around their hips to store metals and any other interesting or rare reusable or recyclable items they happen to come across, and holding onto a large thick plastic bag to store either cardboard or mixed

plastics, waste pickers survey the landscape. Many do not wear safety gloves, but nearly all of them wear a cap or wrap a t-shirt around their head, leaving only their eyes exposed like a balaclava, in order to protect their skin from the sun and keep dust and airborne particles away. As a tipper lorry arrives at *Maciço* – sometimes 2 or 3 arrive at the same time – waste pickers gather around it, waiting for the driver to operate the hydraulic ram, raising the front end of the box bed and thus allowing waste to slide onto the ground with the force of gravity (see Figure 9). As a pile of waste starts forming, waste pickers climb on it, rummaging through the waste to look for recyclables. Those who reclaim mixed plastics empty the content of their bags, once full, into super sacks generally borrowed from dealers. Super sacks – industrial bags approximately one-meter-wide, one-meter-deep and a little over a meter tall, which are commonly used in the agroindustry to store grains and widely deployed in recycling – are placed in the open alongside one another near the hut of the dealer to whom they will later sell their recyclables (see Figures 10 and 11). These huts, used by dealers and waste pickers to shelter from the sun during their rest and meal times, have to be relocated roughly every fortnight, when *Maciço* is cleared by bulldozers and steamrollers, which compact the waste and cover it with layers of soil and debris to stabilize the terrain and make room for more waste.

Figure 9. Waste pickers wait for a tipper lorry to be emptied at *Maciço*. September 2016.

Figure 10. Super sacks filled with mixed plastics sit near Cláudia do Beleléu's hut and car, a white Fiat Palio (mid-left). September 2016.

Figure 11. Cláudia do Beleléu (blue shirt and cargo trousers on the left) stands alongside a group of waste pickers near her hut. September 2016.

Waste pickers who are selling to the same dealer keep track of their sack's location based on the others sitting beside it. They look after each other's sacks as they come and go to fill and empty their bags. On average, a waste picker specialised in reclaiming mixed plastics fills between 2-4 super sacks per day at *Maciço*. Since the space is not demarcated and there are no gates or means to protect the materials reclaimed from waste, keeping sacks grouped together and near the dealer's hut is a form of claiming ownership and averting theft, as unavoidable as that might be. Lack of access to space to securely store super sacks which are full is another reason that waste pickers at *Maciço* have no choice but to sell their recyclables by the end of each working day, before returning home. With only a couple of sacks to sell each

due to the spatial-temporal constraints to which they are subject, their bargaining power is rather limited.

It is not only lack of access to physical space and the peculiar temporality to which this spatial deprivation gives rise that constrains their selling options, though; their relative immobility further aggravates their situation. "[M]obility is not just a function of time and space, but an agent in their production" (Cresswell 2006:6). In other words, the act of moving, or the capacity to move if, when and where one so wishes, is imbued with social significance, since it delimits the spatio-temporal frame of subjects, interfering in the most basic aspects of their life – i.e. how they get to work and interact with the city, how often they meet their family and friends, where their kids will study, where they shop for groceries and have their meals, how much rest they can get before starting a new day – and therefore is "implicated in the production of power and relations of domination" (Cresswell 2010:20).

Most waste pickers do not have access to a car, motorcycle or bicycle, and since there is no public transport serving *Lixão da Estrutural*, they have to get to the dump either by walking or by 'truck surfing', i.e. clinging on to the trunk of lorries. Without the means to transport the materials they have reclaimed at the end of the working day, waste pickers have to sell their recyclables to dealers based at *Maciço* and are subject to the prices offered by the latter, underscoring the fact that "practices of wasting and valuing are both spatially and temporally contingent" (Lepawsky and Billah 2011:123). Super sacks are the standard unit of measurement used by dealers when buying mixed plastics at *Maciço*. As of August 2016, a super sack of mixed plastics was worth between R$20-25 (USD 5.20-6.50) depending on an estimate of its net weight, which is generally between 40-46kg. Rosana, the pseudonym of a

waste picker who works at *Maciço* and sells materials to Cláudia do Beleléu, tells me she could get better prices if she were to sort and sell recyclables in other areas of the dump or in its vicinity. However, since she does not have a vehicle and cannot always rely on truck rides, the time and effort required to pull sacks around the dump under a burning sun and through the dust looking for the best price makes the task prohibitive: "I am better off selling materials to Cláudia. I get a lower price per sack, but on the other hand have more time to scavenge, hence have more money by the end of the day", declared Rosana.

Dealers operating at *Maciço* are also affected by the lack of a safe space to store recyclables and of means to transport them, and are, therefore, also constrained to selling their materials on a daily basis, besides having to organise for someone they trust to be on site in the hours when they are not present to look after their stock. Dealers, however, are in a privileged position compared to waste pickers when it comes to their relationship with time. Unlike waste pickers, most dealers have access to savings, which allows them to buy recyclables from the former paying upfront – therefore feeding waste pickers' need for daily cash to pay for their subsistence – and to resell materials to wholesalers, who usually pay once a week, earning a profit in the process. I will come back to that in subsection 6.4 when I discuss the barriers to entry in the brokerage business.

Because they have a significant and consistent amount of recyclables to trade daily, dealers attract buyers based outside the dump, like *Recicle a Vida,* who do have access to vehicles to transport recyclables. Upon arrival at *Lixão da Estrutural*, buyers weigh their empty truck at the weighbridge to determine its tare weight, and then re-weigh it after loading to calculate payment (see Figure 12), which implies

that only recyclables of the same price per kilogram can be transported together. As a rule applicable to transactions between players at different stages of the recycling network, recyclables are only traded on a full truckload basis so as to reduce transport costs, which are one of the most – if not the most – prominent costs faced by the recycling industry, given its spatial concentration in the Brazilian territory and, therefore, the long distances recyclables have to travel until they can be transformed into a product ready to re-enter the consumer market, as will be discussed in more detail in subsection 9.2.

Since dealers do not have access to safe storage spaces, however, they have no choice but to sell – and consequently also to buy – plastics mixed, since they would need more than a day to gather enough plastics of the same type together to be able to fill a truckload. According to Cláudia do Beleléu, given their spatial deprivation, it is strategically sound for dealers to sell plastics mixed, given that the price is directly proportional to quality and quantity in the recycling market. Hence, if dealers were to start selling plastics sorted by type, they would either have to let their filled super sacks sit at *Lixão da Estrutural* until they built up a sizeable stock, thus running the risk of being stolen, or would have to dilute their bargaining power and sell small amounts of each plastic type. However, Cláudia do Beleléu says that the price increase for sorted plastic is not worth the extra time, effort and risk that sorting entails. Instead, she sells mixed plastics to *Recicle a Vida* and other buyers for R$ 0.65 per kg, as of August 2016.

Figure 12. Abidias hands in a weight ticket to Cláudia do Beleléu after weighing *Recicle a Vida*'s truck fully loaded at *Lixão da Estrutural* weighbridge. September 2016.

Contrasting with the vivacity and clutter that characterises *Maciço*, *Coleta Seletiva* is a comparatively orderly and slow-paced tipping area that only receives waste coming from the few neighbourhoods covered by selective waste collection. Located near the entrance of *Lixão da Estrutural*, *Coleta Seletiva* is also much smaller and a lot less crowded than *Maciço* (see Figure 13). Each of the six cooperatives based there have a designated working space, which has a huge impact on how waste pickers organise their daily routine and trade recyclables in the area. Despite the non-existence of visible spatial demarcation – there are no fences, walls, railings or gates – all parties seem to understand and respect the boundaries of each other's territory. Just like at *Maciço*, waste pickers build huts from pallets, tarpaulin and other materials they find on the dump to serve as a base camp where they can shelter from the sun, rest and enjoy a meal. Unlike *Maciço*, however, huts at *Coleta*

Seletiva do not need to be relocated, because it is a sorting rather than a dumping area and, therefore, its terrain does not need to be compacted and levelled every fortnight. These huts are also a means of asserting cooperatives' customary right of occupancy, as it were, over a certain portion of land, since it is a tacit agreement among waste pickers at *Coleta Seletiva* that the waste found in the surroundings of a hut belongs to the members of the corresponding cooperative.

Figure 13. Partial view of *Coleta Seletiva* with waste pickers' huts scattered in the landscape. November 2016.

A member of staff of the company in charge of managing the dumpsite controls the inflow of waste collection trucks at *Coleta Seletiva*, though not because of heavy traffic; in fact, the contrary. As stated previously, selective collection of dry recyclables was still incipient in Brasília when I carried out this fieldwork: only 5.9%

of the waste collected there in 2016 was source-segregated (SLU-DF 2017). Given the relatively small amount of waste tipped at *Coleta Seletiva*, a turn-taking system was devised to ensure that the cooperatives based there would have access to a fairly similar amount of waste. Once a waste collection truck arrives at *Coleta Seletiva*, the dumpsite's staff indicates which cooperative should receive its contents, keeping track of whose turn it will be when the next truck arrives.

The spatial organisation at *Coleta Seletiva* substantially alters waste pickers' working routine, trading opportunities and perception of safety. According to Nildo, who has worked at *Maciço* for some time, one can make considerably more money there compared to *Coleta Seletiva*, because waste is more abundant and competition less fierce. On a good day, he reclaims two super sacks of recyclables at *Coleta Seletiva*, while at *Maciço* he would fill four sacks. However, he thinks that the risks that come with the prospect of making more money at *Maciço* are too high and, in fact, "not worth it", as he describes it, also stating that "it is exhausting and dangerous up there [at Maciço]. We have to fight for space and be very alert and fast because machine operators are merciless and come from everywhere pushing materials. The other day a truck driver drove over a waste picker's foot". José Gomes, who is now in his sixties and started picking waste at *Lixão da Estrutural* in 1981, when, jobless, he moved to the Federal District, agrees with Nildo and says that he cannot handle the pace of work at *Maciço* anymore, nor the need to be constantly alert to what is happening around him. Instead, he prefers to pick waste at *Coleta Seletiva*, where the vehicular traffic is considerably lighter and space is tacitly demarcated.

Since cooperatives at *Coleta Seletiva* have an allocated space where waste pickers can stock materials, they usually collect all sorts of recyclables, unlike their counterparts at *Maciço*, who commonly specialise in reclaiming either cardboard or plastics. This makes waste pickers at *Coleta Seletiva* slightly less vulnerable than those at *Maciço*, since their livelihoods do not depend on any single material. The regularity with which they trade recyclables is also different. Waste pickers at *Coleta Seletiva* often stock materials for around a week, and for as long as a month in some rare cases. However, since waste is scarcer there and the price difference between sorted and mixed plastics is negligible at *Lixão da Estrutural*, most waste pickers with whom I spoke at *Coleta Seletiva* feel that they are better off selling plastics mixed, just like their counterparts at *Maciço*, though for a different reason (for waste pickers at *Maciço* selling plastics sorted was not an option, due to their lack of access to space). With higher volumes to trade, thanks to their access to space and the temporal flexibility to trade that comes with it, they can leapfrog dealers and sell directly to buyers outside the dump in some cases, therefore having a higher chance of gaining a better price. Nonetheless, for reasons that shall be discussed in depth in subsection 6.4, waste pickers from the same cooperative do not usually trade materials together; rather, they sell independently. In fact, the cooperatives at *Coleta Seletiva* serve the sole purpose of creating a tacitly agreed fictitious demarcation of territory, which grants waste pickers exclusivity over the waste contained within it, as well as the opportunity to build up a stock of recyclables.

The practice of stocking is not without its risks, though, given that materials are left in the open in super sacks near the cooperatives' huts. In fact, waste pickers at *Coleta Seletiva* consistently report being victims of theft. José Gomes, for

instance, collects around 15 super sacks of mixed plastics per week, and does not like to wait too long to sell them, arguing that, despite having a place to store sacks, theft of materials is constant. Juliana further claims that criminals are most active on Sundays, because there is no waste collection on that day and, therefore, no trucks tipping waste at *Lixão da Estrutural*. As a result, most waste pickers take the day off, creating the perfect occasion for criminals to act. Waste pickers often blame these misdeeds on the *noiados*, drug addicts who allegedly steal recyclables to buy drugs: "*Noiados* are usually after the most valuable materials, like aluminium cans. They perforate bags and make a mess. Since there is no control over who gets in and out of the dump, we are vulnerable", declared Juliana.

The capacity of waste pickers based at *Coleta Seletiva* to take full advantage of the space they have access to, though, is further limited by their differential mobility. Juliana, her husband Nildo, and other members of *Ambiente* who work at *Coleta Seletiva*, for instance, sell mixed plastics to Zezinho and Fábio, who pick and broker waste at *Coleta Seletiva*. Luckily for Juliana and Nildo, the cooperative to which they are affiliated, *Ambiente*, not only has an allocated space at *Coleta Seletiva*, where they can store materials, albeit in the open, but also has a truck – small, old and almost falling apart, but still fit for purpose. Having access to space and to means of transporting waste in a time-effective manner puts them in a privileged position compared to most waste pickers in the dumpsite, even among those at *Coleta Seletiva*, because it implies that they can use the weighbridge at the dumpsite's entrance and sell the recyclables they reclaim by weight. This more often than not results in them earning more money per kg than their fellow waste pickers, who sell by the sack.

While Zezinho and Fabio paid R$ 0.60 (USD 0.15) per kg of mixed plastics to Juliana and Nildo, they paid between R$ 20-25(USD 5.20-6.50) per sack to waste pickers like José Gomes, equivalent to approximately R$ 0.52 (USD 0.13) per kg, as of August 2016. José Gomes, like Zezinho and Fábio, is affiliated to *Coopere*, and since this cooperative does not have access to a vehicle to transport materials, he has to sell mixed plastics by the sack. When setting the price of a sack, dealers take both weight and the quality of materials into consideration, but they often underestimate the first. This results in waste pickers who sell mixed plastics by weight earning slightly more per kg than those who sell by the sack, while, among the latter, those based at *Coleta Seletiva* usually make slightly more per sack than their peers based at *Maciço*, due to the better quality of their materials.

Tiazinha, waste picker and director of *Carrefa* (see Figure 14), another cooperative based at *Coleta Seletiva*, is also hurt by her relative immobility. Nonetheless, she refuses to sell the plastics she collects to fellow waste pickers who have become brokers, like Zezinho and Fábio, bluntly declaring: “I am carrying no one on my back. They go make profit in hell, but they are not profiteering from my sweat” (the curious relationship between waste pickers and brokers will be dealt with in more detail in subsection 6.4). Instead, Tiazinha sells mixed plastics to Marcus, a buyer who has managed to install some basic infrastructure to sort and bale recyclables, mostly plastics, inside *Lixão da Estrutural* in an area adjacent to *Coleta Seletiva*.

Figure 14. Tiazinha stands besides cardboard boxes she retrieved at *Carrefa*'s designated area at *Coleta Seletiva*. November 2016.

I did not manage to find Marcus at the dumpsite during any of my visits, but I talked to a couple who work for him during the day, sorting the mixed plastics he buys from waste pickers like Tiazinha. In the evenings and through the night, until midnight, they pick waste at *Coleta Seletiva,* affiliated to the cooperative *Coopere*. On average, they fill two sacks per night each, and sell these to Marcus for R$20-25 (USD 5.20-6.50) per sack. Like Juliana from *Ambiente*, they claim that there is not enough material for everyone at *Coleta Seletiva* and, since they consider it dangerous to work at *Maciço* due to the hectic traffic of heavy duty machines and the fumes emitted by the pipes emerging from the ground, they started working for Marcus to complement their income, earning R$ 5.00 (USD 2.08) per sack sorted.

Marcus' privileged spatial position within the dump affords him certain benefits over competitors. Because his shed and equipment for baling plastics are

located just across the road from *Coleta Seletiva*, he has no transportation costs to bear. These costs are usually quite substantial in the recycling industry, especially in the plastics sector, due to aspects related to their materiality. Sold loose by waste pickers and dealers at *Lixão da Estrutural*, mixed plastics are bulky and lightweight and therefore relatively expensive to transport. Since Marcus does not have to incur such costs, at least not the cost of transporting plastics loose, he has a considerable comparative advantage over other buyers.

I became curious as to how Marcus and the two other buyers who have installed infrastructure within *Lixão da Estrutural* managed to establish their business there, on land owned by the government. An informant familiar with the story of *Lixão da Estrutural* told me that "no one messes with them", suggesting that confronting them or challenging their position at the dump would be risky. According to my informant, buyers started transferring machines to an area near *Coleta Seletiva* under the mandate – and with the support – of Joaquim Roriz, who held office as governor of the Federal District four times between 1988 and 2006. Roriz is known around Brazil for his populist measures as well as for his questionable reputation, having been accused of racism, embezzlement, forgery and misrepresentation. The informant was unsure about the type of agreement, if any, in place between Roriz and the buyers, but says that now that they are settled in the dumpsite, nobody is able (and possibly has even tried) to evict them. Another possible, if no more pragmatic, explanation for the government's leniency, however, may be the fact that buyers contribute to divert recyclables from the dump, therefore extending its lifecycle. Hence, their permanence does more good than harm to the

government, according to the utilitarian calculus that usually guides decision-makers in the public sector.

With regards to dealers based at *Coleta Seletiva*, their business is only possible due to their access to space and to the temporal preference (sometimes verging into temporal boundedness, for subsistence reasons) of some waste pickers for earning cash more often, even if in smaller quantities, therefore avoiding the risks intrinsic to stocking. Since waste is scarce at *Coleta Seletiva*, dealers often require longer than a day to have enough mixed plastics in stock, for instance, to fill a lorry and therefore attract a buyer. In fact, Zezinho and Fabio generally take around three to four days to reach this threshold, a reality that contrasts with their counterparts based at *Maciço*, who often trade two lorries of mixed plastics per day. In any case, Zezinho and Fábio sell mixed plastics to *Recicle a Vida* for R$ 0.65 (USD 0.17) per kg, the same price paid by the cooperative to dealers based at *Maciço*, like Cláudia do Beleléu.

This section has hopefully evinced how the different possibilities offered by *Coleta Seletiva* and *Maciço* in terms of waste pickers' and dealers' engagement with space-time, as well as their differential (im)mobilities, affect their trading prospects. Waste pickers who are spatially deprived, and therefore subject to a strict temporality in their business relations due to not having access to a safe place to stock materials, as well as those who do not have access to a means of transport to weigh their recyclables at the weighbridge located at *Lixão da Estrutural*'s entrance, not only have their trading options limited to dealers operating within the dump, but are also bound to sell mixed plastics by the sack, which implies a lower price than if selling by weight. To quote Soja, however adding a temporal dimension to his statement,

"the geographies in which we live", and the temporalities intrinsic to them, "can intensify and sustain our exploitation as workers, support oppressive forms of cultural and political domination (…) and aggravate all forms of discrimination and injustice." (2010:19)

6.4. "Most waste pickers are not ready for that": A political-semiotic appraisal of 'formal' and cooperative work

All the waste pickers with whom I spoke at *Lixão da Estrutural* were members of a cooperative or association, although all of them, without exception, saw no advantage in being members. Most had also worked in the so-called formal economy, yet still decided to quit their jobs and go back to picking waste at the dump, which many described as having some sort of "magnetic effect" over them, dragging them back. This section uses empirical data to problematize cooperatisation and formalisation as possible alternatives to empower waste pickers, drawing primarily on political and semiotic arguments. My intention is not necessarily to contest the validity of these approaches as viable courses of action, but to expose some of the challenges that lie ahead, obstructing the fulfilment of their potential.

Among the questions I had prepared for the waste pickers when planning my fieldwork, I included one to inquire whether they were affiliated to a cooperative. I thought the answer would be obvious, but decided to include it anyway. Since the waste pickers I was engaging with were based at *Lixão da Estrutural* and therefore did not have a shed of their own, I assumed their answer would be no, based on the premise that a cooperative would need to have a private workspace in order to exist. After hearing the same unambiguous "yes" over a dozen times, I rephrased my

question to: “Which cooperative are you affiliated to?” Just as unequivocal as their affiliation was their perception of the cooperative to which they belong: “it makes no difference”; “it serves no purpose”. Why, then, were they affiliated in the first place? The waste pickers argued that membership was a requirement given by SLU, but could not explain how such a requirement was made or the implications of non-compliance. Nonetheless, SLU Director Heliana Kátia denied the existence of such a requirement.

My understanding following my fieldwork is that despite the inexistence of a formal requirement of membership, SLU might have encouraged waste pickers to join cooperatives, even if tacitly, when carrying out surveys to inform the elaboration of the transition plan to the new landfill. It is easier for the government to establish a dialogue with waste pickers if they are organized. Cooperatives based at the dump were promised a workspace as well as a monthly stipend once *Lixão da Estrutural* was closed, and waste pickers might have deduced that if they were not affiliated to a cooperative, they would not be able to enjoy these benefits. The result was the formation of cooperatives and associations which, in fact, are not based on collective work, not least because they may lack a space to organise their tasks, such as at *Maciço*, as discussed previously (see subsection 6.3). As Gutierrez and Zanin (2011:120) point out, the lack of control over the means of production, through exclusive access to physical space, endangers the autonomy and sustainability of cooperatives, therefore providing empirical evidence that cooperatisation is not an easy solution to address the problem of waste pickers’ poverty.

Space, however, is not the only culprit. Misunderstandings concerning the meaning and practical implications of cooperative work further limit its potential to

improve the lives of waste pickers. At *Maciço*, not only do waste pickers work autonomously, usually alongside friends, regardless of cooperative; they also trade independently, with rare exceptions, usually when pickers are married. The same pattern can be observed at *Coleta Seletiva*, where space is less of an issue. Despite their spatial organisation, their affiliation to a cooperative does not commonly imply collective modes of work or division of tasks, just like at *Maciço*. The closest waste pickers from the same cooperative based at *Coleta Seletiva* usually get to true collaboration is agreeing on shifts to guarantee that everyone will have a chance to reclaim some recyclables. José Gomes, for instance, an elderly waste picker affiliated to *Coopere*, a cooperative based at *Coleta Seletiva* and whose name ironically means 'to cooperate', reports that six members of the cooperative work in its designated area during the day, and another six during the night. Nonetheless, none of them pick or trade recyclables together. Such dynamics restrict waste pickers' choice of trading partners to dealers operating in their picking area, i.e. *Maciço* or *Coleta Seletiva*, due to the small scale of their transactions. This affects their earnings considerably, as is clear from a comparison between the estimated average income of waste pickers and of dealers at *Lixão da Estrutural*.

On average, waste pickers make between R$800 and R$2,000 (USD 210-530) per month, with those at *Maciço* usually making more money than their counterparts at *Coleta Seletiva*. The average earnings of dealers, on the other hand, are much higher than that. Their profit margin is around 20%, considering that, as of August 2016, they were earning R$ 0.65 per kg of mixed plastics while paying the equivalent of R$ 0.52 per kg, calculated by dividing the average price paid per sack, i.e. R$ 22.50, by the average weight of sacks, i.e. 43 kg. Taking the example of

Cláudia do Beleléu, who trades approximately 12 tonnes of mixed plastics weekly – not all of this to *Recicle a Vida*, however, since the cooperative's demand is less than her capacity to supply – this means an estimated monthly income of around R$ 6,000 (USD 1,600).

Trading collectively appeared to me to be an alternative strategy for waste pickers to overcome their spatio-temporal constrains, leapfrog dealers, and trade directly with wholesalers therefore obtaining better prices and increasing their income. After asking dozens of them why they continued trading individually, I identified free-riding as an inevitable point of concern for them. In their imaginaries, forms of cooperative work and trade give rise to opportunistic behaviour on the part of some, who would work less than they normally would if working alone in order to take advantage of the work of others. This fear is based on their assumption that trading collectively necessarily implies splitting revenues equally regardless of individual productivity – which is indeed the case in certain cooperatives and associations (see, for instance, Maciel et al. 2011) – ignoring the fact that payment methods can be freely agreed upon between the members of a collective. Such misconceptions about the nature of payment arrangements in cooperatives is evident in José Gomes' declaration: "Each person is able to fill a different number of sacks per week and it would not be fair to trade together". Although trading collectively would require a level of organisation at a social, spatial and temporal level that seems, in any case, unlikely to be achieved at *Lixão da Estrutural*, especially at *Maciço*, waste pickers could counter their key concern by agreeing on a payment structure based on productivity, if they so wished.

If it is true that in the process of making sense of the world we make sense of ourselves (Sum and Jessop 2013), then waste pickers' construal of cooperative work as an opportunity for free-riding indicates that they have a perception of humans as prone to dishonesty. Wood's discussion of the Faustian bargain in which the poor are trapped is illustrative here, and helps in problematizing waste pickers' fear of free-riding associated with collective work. Based on an analogy with peasant societies, Wood (2003) argues that uncertainty is a key attribute of the life of poor people, deriving from instability and volatility on many levels and dimensions of their existence. In more concrete terms, uncertainty "destabilize[s] the[ir] moral universe in terms of trust, loyalty and responsibility", especially when money is involved, resulting in an interpretation of the world as a place of "cheats, free-riders and predators" (Wood 2003:468). In the absence of the social capital needed for their good functioning, cooperatives at *Lixão da Estrutural* end up becoming mere abstract phenomena. As a result, waste pickers become tied to relationships and structures which, despite providing for their "immediately needed security (…) displace the longer term prospects of a sustained improvement in their livelihoods" (Wood 2003:455): the Faustian bargain.

This is not to say, however, that there are no moral norms guiding waste pickers' behaviour, or that they do not cooperate or engage in mutual assistance on any matters, since it is clear that they do, especially in their non-economic relations and among their inner circles of friends – just remember how waste pickers selling to the same dealer look after each other's sacks to avoid theft, as described elsewhere in this chapter (see subsection 6.3). My contention is simply that, when it comes to economic activity, moral norms are compromised by market forces, particularly

when the latter are informed by neoliberal principles and therefore "encourag[e] and sometimes oblig[e] us to act purely in our self interest – if not immorally, then at least amorally" (Sayer 2000:91). In fact, although the economy is inherently a social phenomenon, "with the acceleration in the development of division of labour and competitive markets, economic activities became increasingly 'disembedded' from earlier social attachments" implying the "expulsion of moral questions from matters of the running of economies" (Sayer 2000:86–87).

It is interesting to note that although waste pickers dread the thought of their peers working sluggishly in order to profit from their own hard work, they are content to have dealers doing effectively the same thing. Semiosis can help us in putting waste pickers' trading preferences into perspective, conceiving these preferences as resulting from the internalisation and naturalisation of the capitalist logic as a structuring economic imaginary, i.e. a "semiotic syste[m] that frame[s] individual subjects' lived experience of an inordinately complex world and/or inform[s] collective calculation about that world" (Jessop 2010:344). The framing imposed by capitalism "through the development of discourses so abstract as to be opaque to the mass of the population" (Harvey 2006a:83) leads to the shared belief that competition enables a more efficient allocation of resources and therefore renders deceitful behaviour supposedly less likely than under conditions of cooperation. If, on the one hand, such a belief and the practices that stem from it derive from the capitalist imaginary, on the other, they help to retain and reinforce it along with its accumulative logic. As Harvey clearly states, "[t]here is no way we can expect the rules and laws of capital accumulation to enter into the socio-ecological world in an unmediated way", which in turn implies that these "are

refracted through actual discursive practices, understandings and behaviors", and that "the task for critical enquiry is to penetrate to the underlying meaning of such phenomena and to explore their ramifications for daily life" (2006a:83–85).

Nonetheless, a purely semiotic appraisal of waste pickers' discourse around free-riding could also lead to the hasty conclusion that they think of themselves as being more dishonest than others and, in particular, more dishonest than dealers, since they would rather sell independently to the latter than sell collectively to a recycler, which does not seem to be the case. However, semiosis and structuration are intertwined (Sum and Jessop 2013). Taking structuration – or a political-economy perspective – into consideration leads to the more likely conclusion that waste pickers' preference for selling to dealers results not from their perception of the latter as being more honest than their fellow waste pickers, but from their inability to avoid the presumed dishonesty of dealers – which they would certainly do if they could – within the "limits of compossible combinations of relations among relations within specific time-space envelopes" (Sum and Jessop 2013:4).

All the same, it is widely known that individuals doing what Zezinho calls "liaison between waste pickers and buyers", or brokers, are not exactly competitors since, in his own terms, they also "cooperate in some matters"; although some would likely deem it more appropriate to refer to said cooperation as collusion, which is a form of deceitful behaviour: "We [brokers] make an agreement on the basis of what buyers pay us. We agree on price so that…. so that [sic] it does not happen that you put a price and someone else offers a different price", said Zezinho. In other words, whereas it is within the power of waste pickers to avoid the dishonesty of their peers,

they have no alternative but to surrender to the dishonesty of dealers within the hierarchy of the recycling market.

These complexities are intrinsic to cooperative work, so often portrayed simplistically in the literature as a miraculous and straightforward solution to empowering waste pickers. Adopting a functionalist view of cooperatives, and therefore understanding them as a precondition for the establishment of partnerships between waste pickers and local authorities for the provision of waste collection services, scholars all too easily neglect preconceptions about the functioning of cooperatives and, even more fundamentally, ignore the uncertainties waste pickers face and which severely undermine their choices and capacity to collaborate. "Solidarity is not necessarily natural" (Wood 2003:461) among humans, at least not when it comes to economic relations under a neoliberal order, with the attendant short term pressures towards malfeasance and opportunism (Sayer 2001). This is no different among the poor, despite assumptions to the contrary. In the "hostile political economies" in which the poor are immersed, "characterized by inequality, privilege and exploitation rather than abstract laws of supply and demand" (Wood 2003:468) there is even less room for collaboration to emerge naturally than there already is in the context of the competition driven economies we live in. Reciprocity drives human behaviour; hence the tendency is that when you cannot expect much from others, you will be neither ready nor willing to give much in return. Under such circumstances, cooperative work presents more pains than gains.

Other variables also interfere in the equation, though, and act to prevent waste pickers from trading collectively. Most of the cooperatives based at *Lixão da Estrutural* are associated with *Centcoop*, the first network of cooperatives and

associations of waste pickers of the Federal District; there are only two, *Rede Alternativa*, coordinated by *Recicle a Vida*, being the other. *Centcoop* has an agreement with *Capital Recicláveis*, the wholesaler whose headquarters are less than three kilometres away from *Lixão da Estrutural*, according to which cooperatives associated with the network earn R$ 0.02 per kilogram of recyclables sold by their members to the wholesaler. The fee is deducted from the sum waste pickers would normally receive upon each sale and is transferred directly by *Capital Recicláveis* to the corresponding cooperative. Although it may initially seem that its practical effects are limited, since very few waste pickers trade directly with *Capital Recicláveis* – direct transactions are mostly confined to waste pickers based at *Coleta Seletiva* – the fee is levied on transactions involving dealers as well, since most of them are also waste pickers and, therefore, registered as members of a cooperative. Hence, the fee affects nearly everyone, particularly those trading in the cardboard market, where *Capital Recicláveis* is most active. It is a cause of distrust and speculation among waste pickers, who often accuse the directors of cooperatives of misusing funds for their own personal gain, instead of using them to the benefit of the cooperative.

Aline, director of *Centcoop*, argues that cooperatives use the money to pay for administrative and operational costs incurred in representing their members before trading partners and governmental agencies, but acknowledges that misapplications have happened in the past. A waste picker who would rather not be identified told me that the director of the cooperative to which he is affiliated only shows up at *Lixão da Estrutural* once a week, after stopping by *Capital Recicláveis* to collect what he calls “her fee”, thus insinuating that the money is not spent within

the cooperative. Although the fee is not inherently a bad thing, since cooperatives certainly need funds to be able to support and represent their members, there should be more transparency on their side. Obscurity with regards to how the money is being spent discredits and de-legitimises cooperatives, and further contributes to perpetuating the misunderstandings surrounding cooperative work.

Having worked as a waste picker at *Lixão da Estrutural* for over twenty years, Gilmar, director of *Cooperdife*, a cooperative based at the transhipment station I visited at *Sobradinho*, adds more elements to the table, which help to empirically elucidate some of the challenges of promoting cooperatisation among waste pickers. He contends that most waste pickers have become used to a "live by the day" way of life and therefore prefer to be paid daily, a practice common only among dealers. Interestingly, Furniss refers to a similar preference among the Egyptian Zabbaleen, "who are not primarily scavengers but collect along defined, often hereditary, routes, removing all waste, valuable or not" (2015:25), and who, in choosing their trading partners, often prefer to sell for a lower price if it means getting cash immediately. According to Gilmar, "trading collectively requires abiding by certain ground rules, sharing common costs, and waiting to receive payment, since buyers in the recycling market often pay only a couple of days after materials have been delivered at their door, and most waste pickers are not ready for that".

Tiazinha, a female waste picker based at *Coleta Seletiva* who has spent the last 30 years of her life picking waste at *Lixão da Estrutural*, agrees with Gilmar, stating that "some people just do not want to be bothered; they do not want the trouble of having to coordinate sales and have elected someone to take care of this for them [i.e. dealers]. They want to focus on picking". According to both Gilmar

and Tiazinha, while many waste pickers prefer to sell to dealers, and hence get cash on the spot, because they need money to pay for the daily subsistence of their families, for a few this preference is associated with the desire to satisfy addictions: “Lixão da Estrutural is an environment which is hard to cope with and not rarely waste pickers seek refuge in drugs and alcohol”, declares Gilmar. Tiazinha, however, puts this preference for cash-in-hand into perspective, arguing that it is also motivated by a lack of trust in dealers, therefore corroborating the argument raised above about the need to examine the structural reasons why they would rather trade with dealers than sell collectively, despite perceiving their peers and dealers as equally dishonest. Tiazinha contends that, despite maintaining sometimes long-lasting relationships with brokers, waste pickers are often suspicious of them. They fear that by postponing the receipt of payments, they might end up not being paid at all or facing disagreements as to the amount of materials that were sold and hence how much they should earn.

The relationship between brokers – like Zezinho, Fábio and Cláudia do Beleléu – and waste pickers was quite intriguing to me. All of the dealers with whom I spoke were waste pickers as well, and they clearly made more money than their peers who only picked, due to their brokerage business. So why did other waste pickers not become brokers as well, in order to improve their income? This thought occurred to me not because I believe this is the best way forward for them in terms of socioeconomic empowerment, which is clearly not the case, but because I was interested in understanding what made some take this route, as well as what prevented others from joining it. Surprisingly, most waste pickers with whom I talked had never even considered the possibility of becoming brokers. This,

according to two research participants who are not waste pickers or dealers at *Lixão da Estrutural*, but have a long history of engagement with them – and whom I shall not identify, based on the compromising nature of their declarations – results from the fact that "most waste pickers are not very entrepreneurial".

This thought initially appealed to me as a viable explanation. If it is true that "poor people's aspirations mainly reflect their cognitive world" (Ibrahim 2011:4), with education certainly playing a key role in that, then the fact that only a third of Brazilian waste pickers have finished elementary school, and a fifth are illiterate (IPEA 2013), would certainly affect and severely impair their aspirational abilities. According to such reasoning, they do not aspire to become brokers either because it is unimaginable in their frame of reference, or because they judge it to be unattainable, given their lack of opportunity to fully develop their human capital. Although I still think that there is an element of failure to aspire caused by the deprived environment in which most waste pickers were raised – a thought which is certainly associated with my comparatively privileged socioeconomic position – a more careful consideration of the matter made me realise my own unconscious class-based biased towards them. There can be nothing more entrepreneurial than being able to make a living out of what others have discarded as valueless. Looked at from this angle, waste pickers are in fact the epitome of entrepreneurship, and suggesting the contrary would imply an assumption that the problem lies with them, as if blaming them for their precarious condition, which would be unacceptable.

Two waste pickers with whom I talked presented a much sounder explanation for why they do not make their way into the brokerage business, which they would do if they had the means. According to them, in order to become a

broker, one needs to have savings to purchase super sacks, which cost around R$ 3.50 (USD 0.92) each, as well as to pay waste pickers upfront, as is the norm at *Lixão da Estrutural*. Brokers, as I came to learn, are usually paid weekly – that is *Recicle a Vida*'s policy, for instance – so they must have some cash to invest in their business, given that waste pickers customarily demand daily payment, as stated previously. Because most waste pickers' meagre earnings are just enough to pay for their living expenses, financial capital can be said to be a major barrier to entry into the brokerage business. However, there are ways around this barrier.

In one of my first visits to the dump, for instance, I heard Fábio, who works as a broker alongside Zezinho at *Coleta Seletiva*, ask Cláudia from *Recicle a Vida* for R$ 600.00 (USD 158) as a cash advance. He argued that competition among dealers at *Lixão da Estrutural* had suddenly arisen due to a material shortage at *Coleta Seletiva* caused by a strike by the employees of the company hired to provide selective waste collection. Without the money to pay waste pickers up-front, he was failing to make purchases and was therefore asking *Recicle a Vida* for support to be able to continue brokering. After phoning Mônica to check *Recicle a Vida'*s bank account balance, Cláudia informed Fábio that the money was being transferred to his account. His request was only granted because he is a long-time partner of *Recicle a Vida* and Cláudia knew he would not default. Were Fábio a dealer they had never traded with before, the cooperative, and in fact any other buyer, would probably not be so gracious. In any case, there would be no harm in making such a request.

Gill's observations while analysing the social, economic and political factors that structure exchange relations between waste pickers and their dealers in the plastics recycling sector in India point to a similar direction with regard to the need

to contemplate financial aspects. The existence of institutionalized discrimination that constrains the choice set available to waste pickers, due to their low caste, depriving them of the ability to make competing claims against dealers, surely plays a major role in explaining why they view themselves as better off despite being subject to the power of dealers, rather than foregoing the exchange relation entirely (Gill 2010). However, as the author goes on to argue, waste pickers are "vulnerable to fluctuations in income because their earnings are closer to a minimum threshold, they have no means of smoothing consumption through self-insurance (either asset ownership or membership of banks/self-help groups in finance)" (Gill 2010:230), and therefore have an important economic incentive to enter into exchange relations with dealers, a situation similar to that which I observed at *Lixão da Estrutural*. Unlike in India, however, waste pickers and dealers in Brazil do not pertain to different social classes and mobility between the two professions is highly possible, if improbable, due mostly to financial constraints.

In fact, when I interviewed Zezinho, he was bothered by my reference to his business as brokerage, arguing that:

- *I am not exactly a broker. A waste picker working here at Coleta Seletiva collects between 200-500kg of recyclables per week, maximum. Wholesalers and recycling companies do not come here to buy such small amounts. Someone needs to coordinate this and there was no one here doing that. We [referring to Fábio and himself] stepped up to liaise between waste pickers and buyers. The right thing would be for every cooperative to have someone in charge of trading materials, but that is not the reality yet.*

Cláudia do Beleléu seemed more comfortable with the label. She grew up picking waste alongside her mother and sisters at *Lixão da Estrutural*. When she turned 21, Cláudia do Beleléu decided to look for a job outside the dump, as she was tired of the environment. Nonetheless, after working as a cooking assistant for a year, Cláudia do Beleléu decided to quit her job and go back to picking waste at *Lixão da Estrutural* where she was "[her] own boss and could determine [her] work shifts on top of making more money". Then in her late twenties, she was no longer only a waste picker but also became a dealer, buying recyclables from a group of around 40 fellow waste pickers, including family members, like her mother and sisters, divided across three shifts, to resell to partners like *Recicle a Vida*. On one of the occasions when we talked, she was providing advice to her niece, who used to sell recyclables to her, but was in the process of entering the brokerage business.

Claúdia do Beleléu's life story brought to mind a discussion raised by Millar (2018) in her ethnographic account of life and labour on Rio de Janeiro's garbage dump. Surprised by never being asked, in either scholarly presentations or casual conversations, among the numerous questions she was asked in the course of her research, why waste pickers keep on returning to the dump, Millar argues that "this question is never asked because the answer is assumed", i.e. "they do so out of necessity, as a means of survival (…) the story ends before it begins" (2018:3). For her, the tendency to frame the work of waste pickers in terms of necessity is closely linked to its classification as informal, which gives the impression that picking waste is a last resort for those left out of the so-called formal economy. Millar's ethnographic experience disproved that, as she found out that work in the dump "is not an end for Rio's poor but rather an experience of continual return" which "hardly

fit the image of life subsumed by the work of subsistence" (2018:4). This, however, is not to say that they do not depend on the money they earn from picking waste in order to survive, but rather that working at the dump *is* a choice, and not a lack of choice, as many assume. Cláudia do Beleléu's life story, as well as the story of many waste pickers with whom I interacted at *Lixão da Estrutural*, pointed towards the same conclusion as Millar's findings, with waste pickers leaving and returning to the dump at different points in their lives; although, in my experience, the older they became, the less intentional, and indeed more driven by a lack of alternative, this process was.

Although I have already explained my disagreement with the scholarship which conceives of the economy in terms of two segments, i.e. formal and informal (see Chapter 2), it is worth stressing here, as part of a semiotically driven analysis of the recycling economy, the implications of such a discourse for the shaping and reproduction of the prevailing capitalist economic imaginary. Framing the work of waste pickers in terms of informality, as if they were entirely excluded from the formal economy, implies an assumption that they do not contribute to processes of capital accumulation. This conclusion, however, seems rather unlikely, since "the materials they collect are tied into a 200-billion-dollar global recycling industry" (Millar 2018:8). Hence, by making sense of waste pickers' underprivileged position in such a way, i.e. as a consequence of their exclusion from the capitalist machinery rather than a result of its engineering, scholars, though perhaps well-intentioned, are providing ammunition for the maintenance and retention of the "always problematic, provisional, partial and unstable *reproduction-regulation* of the capital relation" (Sum and Jessop 2013:26). If a 'formal' job was the key to economically

empowering waste pickers, then they would not willingly return to their unregulated activity.

Whether in ‘formal’ employment or reclaiming recyclables at the dump, waste pickers are a part of the profit-generating engine of capitalism, and any discourse which obscures that should be avoided. Poorly educated – a fifth of waste pickers in Brazil are illiterate and only a quarter of those aged 25 or older finished elementary school (IPEA 2013) – people who work picking waste at *Lixão da Estrutural* would probably be paid the minimum wage, R$ 998 (USD 262) as of January 2019, if they were ‘formally’ employed. With a high chance of earning considerably more picking waste, and on top of that still being able to enjoy the flexibility of determining their own work schedule without being supervised by anyone, it is not hard to understand why many said they did not want to leave *Lixão da Estrutural* when I inquired about their plans for when the dump is closed. Elderly waste pickers like Elza, Cláudia do Beleleu’s mother, probably in her late fifties or early sixties, however, have more modest earnings, often close to or even lower than the minimum wage. Their age impacts on their ability to pick waste, as well as on the likelihood of them getting a ‘formal’ job. Instead of targeting piles of waste that have just been tipped out by garbage trucks – the general preference among waste pickers at *Lixão da Estrutural* – older waste pickers are commonly seen in less crowded areas, where waste has already been rummaged through and, hence, recyclables are scarcer.

In any case, I am aware that, although the monthly income of waste pickers is generally higher at the dump than if they had a ‘formal’ job, they do not usually qualify for certain social security benefits, e.g. state pension, sick leave,

maternity/paternity leave, and jobseeker's allowance, since most of them do not pay National Insurance – less than a fifth does (IPEA 2013). They would otherwise qualify for such benefits if they had a 'formal' employment, assuming employers duly abide by labour legislation, which makes employers responsible for deducting National Insurance from all employee's wages. This is critical since national statistics indicate that nearly half of the waste pickers in Brazil are between 30 and 49 years old, with close to a quarter being over 50 years old (IPEA 2013).

Another point of concern is that waste pickers' income from the dump is usually a lot less predictable and stable than the salary of a 'formal' employee. Climatic and economic circumstances affect the availability of recyclables at the dump, and meteorological conditions affect the capacity of waste pickers to reclaim, meaning that their monthly income – and, consequently, the income of dealers – is highly variable. During summer, for instance, people consume far more bottled beverages and, hence, the availability of plastics such as PET tends to increase at *Lixão da Estrutural* during these months. Nonetheless, with the financial crisis that hit Brazil in 2012 and which remains ongoing, people are consuming fewer bottled beverages and packaged food items than they used to, so the overall availability of plastics such as PET has been declining over the years. Strikes by waste management workers also interfere with the influx of waste to the dump and, hence, with the availability of recyclables. Similarly, weather conditions affect the productivity of waste pickers. Torrential rains, common in the Mid-west of Brazil during summer months, make it hard for waste pickers to rummage through waste to collect recyclables. Why, then, do they still prefer to work at the dump than have a 'formal'

job, with this category potentially including ‘formal’ employment as a waste collector hired by a local authority?

Siegmann and Schiphorst’s (2016) reflections on informality and precariousness at work help to provide a tentative, if only partial, answer to this question. According to them, in the context of neoliberal globalization, it does not make sense to conceptualise the growing impoverishment of the working poor in terms of informality, since work-related insecurity can still be observed among workers who are covered by labour legislation – the so-called precariat, a neologism originating from a portmanteau of precarious and proletariat – in the form of a lack of control over working conditions, job insecurity, and exposure to risk without the necessary equipment to prevent accidents, for example. Siegmann and Schiphorst therefore claim that, “it is time to bring the notions of informality and labour precarity together” and “shift away from regulatory coverage as the defining criteria for precarious work” (2016:115–19). Their considerations indicate that work conditions in the kinds of ‘formal’ jobs which are available in the market for someone with the educational level and experience of an average waste picker might not be so much better, or in fact any better, than working at the dump to compensate for the lower, even if more predictable, earnings they would get. As Maloney observes, “if workers were to choose in between sectors [considering there being only two: formal and informal], they would take into account not only monetary earnings, but all other characteristics and benefits associated with each possible job” (2004:1164), which offers a possible explanation for their preference towards picking waste.

Besides this consideration, the broad and deep uncertainties to which they are exposed on a daily basis with regard to the most elementary aspects of their existence – e.g. 'will I have money to buy dinner?' – structurally constrain their choices, giving rise to a risk management strategy which is biased towards the fulfilment of basic needs in the present at the expense of preparing for the future. In other words, they have a tendency to value the money they *can* get now more than the money they *could* get in the future, meaning that higher pay at the dump with no access to social security benefits is worth more than lower pay as a hired worker covered by social security.

Taking on board "the 'embedded' nature of economic activities – how they are set within social relations and cultural contexts that make a difference to those economic processes" (Sayer 2001:697), in this subsection I have argued that waste pickers' overall negative perception of cooperative work is tied to their general mistrust towards others where money is involved, which in turn is associated with the uncertainties accruing from their deprivation and with the internalisation and naturalisation of the capitalist imaginary, with its guiding principle of self-interest. I have also attempted to demonstrate how working at the dump can be a choice rather than a last resort for many waste pickers, due to the fact that the 'formal' jobs available to those with their educational level and experience are often no more advantegous, therefore suggesting that formalisation alone might not be the key to their economic empowerment. These "lifeworld aspects of economic processes—identities, discourses, work cultures and the social and cultural embedding of economic activity" and the structures that "routinise, formalise and govern actions through specific signals and rules (…) which standardise and fix relationships and

responses for sometimes long periods" (Sayer 2001:688–89) must be taken into consideration by the cooperatisation and formalisation scholarship, because they severely undermine its capacity to deliver what it can in fact achieve, i.e. poverty alleviation.

7. *RECICLE A VIDA*: ATTEMPTING TO CLIMB UP THE NETWORK

Between my visits to *Lixão da Estrutural* during the months of August and September in 2016, I spent time with members of *Recicle a Vida*, the waste pickers' cooperative which became my first point of contact in the field. I observed and participated in all stages of PET processing, from collection to sale. This chapter draws on my engagement with them during this period. It is divided into three subsections. The first provides some context to *Recicle a Vida*'s unusual positionality in the PET recycling network, focusing on the micro-politics of recycling and waste management in the Federal District. Following this, I examine *Recicle a Vida*'s internal processes in light of the materiality of PET bottles, pigments, labels and contaminants to assess how the latter shapes the former and comes to embody the interests of powerful players in the market. The final subsection also draws on operational aspects, but concentrates on examining the extent to which its practices are contingent upon the spatio-temporal embeddedness of the PET recycling economy, which interferes with and limits its prospects of climbing up the recycling network.

7.1. "Learning to walk with our own legs": The micro-politics of waste picking and recycling

When I first met Cleusimar, *Recicle a Vida*'s director, in the early days of my fieldwork, he gave me a brief summary of his life story, which is intermingled with the story of the cooperative. I thus came to learn that *Recicle a Vida* was unique in many more respects than Julio, the researcher who introduced me to Cleusimar,

had told me. Taking the cooperative's story as background, this section discusses the micro-politics of waste-picking and recycling in the Federal District. It describes the unusual means of establishment of this cooperative and reflects upon how this has impacted its relationships with other cooperatives operating in the area, as well as with government authorities. Its aim is mainly to contextualise *Recicle a Vida*'s peculiar position in the PET recycling network, providing yet further arguments to problematize the formalisation approach.

Cleusimar started picking waste in 2005, after serving 8 years in prison for kidnapping the 12-year-old daughter of a politician. He was sentenced to 16 years in jail in 1997, but progressed to a semi-open regime half way through his sentence on the grounds of good behaviour. Allowed to work during the day, returning to prison only to spend the night, he struggled to find a job. Carrying the stigma of serving a prison sentence, he found in scavenging his sole option to help his wife bring up their two kids. In his early days as a waste picker, Cleusimar learned about a man who would give out food parcels in exchange for construction debris. Mr Guilherme, as Cleusimar referred to him, was the owner of a company hired by the government of the Federal District to maintain public gardens and green areas. One of the biggest challenges the company faced in the provision of maintenance services was illegal dumping. Bulky items and construction debris are not usually collected by public authorities in Brazil, so people who generate these types of refuse have to privately arrange for their disposal. Often, these types of waste end up being fly tipped by *carroceiros*, freelance owners of mini trucks hired to do small removals and disposals. To incentivise *carroceiros* to stop dumping waste in public areas, Mr Guilherme created a programme to give out food parcels in exchange for debris.

Together with two women whom he met while picking recyclables, Cleusimar decided to show up the next time Mr Guilherme was supposed to hand out food parcels. He was not looking for food though; instead he asked for two carts to collect more recyclables. Mr Guilherme gave him not only the carts he asked for, but also aided them with the paperwork needed to establish an association, rented a shed for them to sort and store materials, bought them a press, hired a cook, paid for the daily provision of meals at the association and even paid a minimum monthly stipend for the waste pickers. He even deployed a human resources employee from his company, Mônica, to work full-time with them, aiding in the management of the association. She was responsible for leading the food parcel initiative and was passionate about social projects.

Inspired by Cleusimar's life story, the association previously had an agreement with *Fundação de Amparo ao Trabalhador Preso* (FUNAP) – Foundation for the Support of Arrested Workers – to hire inmates who had progressed to the semi-open regime or had been granted probation, which made me understand the inspiration behind the association's curious name: literally 'recycle life', or 'recycling lives'. I later learned that nearly all the male workers at *Recicle a Vida* are former inmates who had been convicted for crimes such as robbery, kidnapping, murder and drug trafficking. Once discharged from prison and with no formal employment opportunities, some of them decided to keep working at *Recicle a Vida.*

Mr Guilherme continued to contribute money to support the association until he went bankrupt in 2006. Since then, Cleusimar and his friends have been forced "to learn how to walk with our own legs", in his words, and *Recicle a Vida* has undergone restructuring, with many members leaving after they were no longer

able to pay every waste picker a guaranteed minimum monthly stipend nor to provide daily meals for free. Without money to pay rent, they had to relocate and secured the right to use an old gymnasium owned by *Sedestmidh* (the Federal District's Office for Social Development) as a shed from 2006 to 2011. Since then *Recicle a Vida* has been trying to negotiate the extension of this right. Although they had not obtained *Sedestmidh*'s formal consent, their presence was still being tolerated there as of 2017.

Despite their financial hardship, members of *Recicle a Vida* negotiated a salary reduction with Mônica, whom Cleusimar acknowledges as "the best inheritance left by Mr Guilherme", to enable them to afford to keep her on. With a monthly salary of R$ 5,000.00 (USD 1,315.00), she is the highest earner at *Recicle a Vida*, earning 40% more than Cleusimar. They are among the few at the organization who receive a fixed monthly salary, while the vast majority are paid according to productivity. Mônica, in her own words, "has worked to create commitment and professionalism among the waste pickers, fighting absenteeism and lack of punctuality, and attempting to develop their sense of ownership over the collective". Along with Cleusimar, she represents the interests of the association to public authorities and resolves day-to-day problems concerning its operation. In fact, it was not clear to me to what extent and with what frequency associates are consulted before a decision is made.

Through donations, grants and loans *Recicle a Vida* has managed to improve the infrastructure Mr Guilherme had financed, adapting the gymnasium to suit its needs. The cooperative acquired four presses, a conveyor belt, a forklift and three lories to optimise its processes. More recently, it bought an industrial plastic

shredder to produce HDPE flakes. At the time of my fieldwork, the machine had been assembled, but they still had to work on the electricity infrastructure needed to put it in operation. As the association got back on its feet, it progressively moved from picking waste towards buying it from brokers at *Lixão da Estrutural* to sort, bale and sell.

The atypical means by which *Recicle a Vida* was established, managed and operated fuelled criticism within the local waste picking community, particularly among members of *Centcoop*, a regional network of waste pickers' collectives that integrates the *Movimento Nacional dos Catadores de Material Reciclável* (MNCR), the National Movement of Waste Pickers. According to Cleusimar, *Recicle a Vida* used to be affiliated with *Centcoop*, but their continuation in the network became unsustainable. On the one hand, members of *Centcoop* challenged the internal organisation of *Recicle a Vida*, claiming it was a company and not a cooperative. On the other, members of *Recicle a Vida* and of some other collectives of waste pickers were unhappy with the organisational structure of *Centcoop*, particularly with the permanence of certain political groups in positions of power.

This disagreement, which evinces the heterogeneity among waste pickers concerning issues as basic as the definition of their own profession – i.e. what counts as waste picking – resulted in the creation of an alternative network of waste pickers' organizations in 2012, led by *Recicle a Vida*: *Rede Alternativa.* This network aims to leverage its affiliated members' position in the recycling network, trading together to gain increased bargaining power, negotiate better prices and leapfrog wholesalers. As the best equipped organisation among the affiliated members of *Rede Alternativa*, *Recicle a Vida* provides infrastructural support to its partners, baling materials for

cooperatives who do not have a press for a fee, as well as storing and commercialising materials under its own name to help partners who do not have legal recognition.

Around the same time that *Rede Alternativa* was created, one of the three companies hired by SLU-DF to provide selective waste collection demanded early termination of the agreement, alleging that it was no longer economically viable, given the low availability of recyclables in its coverage area (SLU-DF 2016). Heliana Kátia, SLU-DF's director, who is openly committed to aiding waste pickers, took this as a chance to give them space in the formal waste management system. As a response to the legal requirement instituted by SLU-DF to be hired for the provision of selective waste collection, *Recicle a Vida* then became a dual-status entity, constituted as both an association and a cooperative. Associations are essentially not-for-profit institutions and hence cannot receive money from the government for the provision of public services. Not all members of the association are members of the cooperative, however. The cooperative pays National Insurance on behalf of its members and, as it stood, *Recicle a Vida* could not afford to pay National Insurance to all of its associates.

Recicle a Vida and three other waste pickers' organizations, two from *Centcoop* and one from *Rede Alternativa*, were the only ones to qualify for the provision of this service. In June 2016, *Recicle a Vida* started providing door-to-door selective waste collection in a pre-determined area of Samambaia, an administrative region adjacent to *Ceilândia*, where the cooperative is based. I spoke with Heliana Kátia three months after the cooperatives had started providing the service. Although she was quite happy with the results, she commented on the challenges that hiring

cooperatives represented for SLU-DF, given "the mismatch between the scale the government would like the waste management system to operate (macro) and the scale waste pickers are able to handle (micro)". She observed that central resources are scarce and it is much easier for government agencies to scrutinise one service provider than to inspect many. She further mentioned that the clash between the two networks of waste pickers' collectives, i.e. *Centcoop* and *Rede Alternativa*, complicates things: "it would be a lot more productive for us and for them if they could overcome their differences and work together".

Talking to Heliana made me consider aspects of the politics behind the formalisation approach that I had not considered before. Although the formalisation discourse usually focuses upon the measures waste pickers should take in order to organise themselves and make it possible for local authorities to hire them, little is said about the capabilities and competencies that local authorities should develop to enable such partnerships. In medium to large urban centres, as is the case in the Federal District, it is very likely that a sole collective of waste pickers would not be able to provide waste collection services to the entire city. Local authorities would therefore need to hire more than one collective, and it is very likely that this would represent a considerable change in their operation, as was clear from Heliana's statement which demonstrated governments' preference for having a small number of candidates for contracts.

Although Heliana seemed genuinely committed to making it work, that may not be the case everywhere. Other public officials may be more concerned with deploying the least amount of effort to accomplish a task, in which case outsourcing the provision of waste management services to a big company would probably be the

most attractive alternative. Therefore, in examining the barriers to formalisation, the literature should not place too much emphasis on waste pickers must do; the scholarship would do well in altering its focus to place local authorities in the spotlight, assessing the incentives and drawbacks to formalisation.

Another interesting point raised by Heliana concerns the micro-politics of waste picking. The existence of two networks of waste pickers' organisations in the Federal District, representing two different political groups, hindered their engagement with SLU-DF. Similar dynamics may be observed elsewhere, especially in bigger urban agglomerations, where there is likely to be more than one collective of waste pickers. Nonetheless, the formalisation literature usually represents waste pickers as a monolithic professional category within which all parties share the same interests, without taking into consideration that there may be different factions within the same city. This begs the question of how to articulate these interests, secure representativeness and allocate tasks in order to organise a functional waste management system with the participation of collectives of waste pickers.

There was another thing which Heliana did not touch upon, but which drew my attention: the fact that waste pickers were hired to provide a service in an area where a company claimed such service provision was not economically viable due to the low availability of recyclables in waste streams. It soon became clear for *Recicle a Vida* why the company had given up on the contract. Contamination and theft were the biggest challenges that the cooperative faced. Householders and shopkeepers were not properly segregating their waste and, therefore, a large share of what *Recicle a Vida* collected was actually refuse. On some occasions, however, the cooperative was not even able to collect the waste. Knowing their collection

schedule, profiteers driving small trucks were "stealing waste bags", as Cleusimar phrased it, to later sell recyclables to wholesalers like *Capital Recicláveis*.

On one of the occasions when I joined *Recicle a Vida*'s waste collection team for a day of work, I was able to see this first-hand. We spotted three such trucks, one of which was two blocks ahead of us, doing the same route that *Recicle a Vida*'s driver was supposed to make, therefore leaving no waste for the collectors to pick. The cooperative's driver even changed the route to overtake them, but nonetheless, on that day *Recicle a Vida*'s collectors returned to the cooperative with only a fifth of what they expected. For these reasons, *Recicle a Vida* still had to rely on brokers at *Lixão da Estrutural* as its main supply source, which made its members' classification as waste pickers a contentious issue among the local waste picking community and its position in the recycling economy somewhat peculiar. Cleusimar hopes that the provision of selective waste collection will become a more substantial source of recyclables in the future, once they raise awareness among householders about the importance of source segregating waste and also figure out a way of preventing profiteers from "stealing" waste.

Cavé's study of urban waste appropriation conflicts in emerging countries, however, suggests that "it is actually more probable that informal actors will be increasingly threatened by 'urban mining'" (2014:820), i.e. the recovery of recyclables from public dumpsters by actors not directly involved in waste management. His claim is founded on the observation that the economic value of certain components of urban waste becomes clear as the market increasingly turns to secondary materials as an alternative for raw materials, the prices of which are soaring as a consequence of their exhaustion. Cavé's remarks about urban mining are

particularly enlightening in a context where formalisation is promoted as a key strategy to improve waste pickers' socioeconomic condition. If in the past the main obstacle to formalisation was the dichotomy between the interests of large waste management companies and waste pickers, the reality is now more complex. As more actors turn to waste as a location of resources and not only residues, the prospect of formalisation delivering on its promise of poverty alleviation becomes more and more unlikely.

This subsection has explored various facets of the politics of waste picking and recycling in the Federal District. Starting with the story behind *Recicle a Vida*'s name, which is revealing of the wider social dynamics which draw marginalised populations to waste picking, such as former inmates, it progressed to examine how, in "learning to walk with its own legs", given its unusual means of establishment, *Recicle a Vida* created a schism in the local waste picking community. This division, which culminated in the creation of an alternative network of cooperatives, i.e. *Rede Alternativa*, for dissidents from *Centcoop*, was then discussed as a key challenge in SLU-DF's process of hiring cooperatives for the provision of door-to-door selective waste collection. The politics permeating this process and concerning, for instance, the mismatch between the operational scale of waste management desired by the government (macro) and that delivered by cooperatives of waste pickers (micro), as well as the profitability of the contracts allocated to cooperatives, was further scrutinised to demonstrate the complexities intrinsic to formalisation.

7.2. "Recycl*able*, with no commercial value": Negotiating the resourceness of PET bottles

Recicle a Vida's shed is located 13 kilometres away from *Lixão da Estrutural.* Being close to the dump is strategic for any buyer who has business with brokers based there. It is worth remembering that brokers usually sell plastics loose, and since these are bulky and lightweight, transportation costs are considerable and can be prohibitive if buyers are located too far away from *Lixão da Estrutural*. Aiming to transport plastics more efficiently, Cleusimar and other members of *Recicle a Vida* designed and built a cage structure to be welded to one of the cooperative's trucks. This solution is an ingenious alternative to the ordinary method adopted by smaller buyers to transport plastics bought from brokers at the dump, i.e. by piling and tying super sacks to the lorry bed, though it is not as efficient as the tipper lorries commonly owned by big wholesalers, which have hydraulic rams to facilitate unloading. Loading the cage truck required dexterity. I watched the process numerous times as I accompanied Abidias, one of *Recicle a Vida*'s drivers, to *Lixão da Estrutural.* Abidias and Antonilson, Cláudia do Beleléu's husband, would drag the sacks onto the bucket of a skip loader tractor operated by one of SLU-DF's employees, two at a time. Beleléu would also hop into the bucket, in between the sacks, as the operator lifted it until it reached the open top of the cage truck. With one foot in the scraper at the edge of the bucket and the other at the top of the cage grid, Beleléu would balance himself as he unloaded the contents of the super sacks into the truck, throwing the empty sacks onto the ground for Cláudia do Beleléu to collect. He wore no safety equipment and made it look like a trivial task, despite the often strong wind and the weight of the sacks (see Figures 15 and 16).

The territorial embeddedness of buyers – i.e. their geographical proximity to the dump –, the development of the cage truck by *Recicle a Vida*, and the effort required to load it demonstrate the 'thing-power' (Bennett 2010b) of plastics, i.e. their capacity to provoke actions and to rework bodies and environments (Gabrys et al. 2013). Through their characteristics and properties, plastics act upon agents partaking in the recycling industry, delimiting their range of possibilities and actions. This section discusses how the materiality of PET bottles, as well as of other materials added to them or that come into contact with them, shapes *Recicle a Vida*'s internal processes and the meanings of PET, consequently interfering in its transformation back into a resource. My argument is structured primarily around the case of pigments added to bottles and of heat-shrink sleeve labels made of polyvinyl chloride (PVC), though I also discuss, to a minor extent, the impact of contaminants and of remnants of contents found in bottles. In so doing, this section begins a discussion that will permeate the following chapters about how matter – and more specifically plastics, in the case of this thesis – through its materiality can become a relay mechanism for the exercise, enforcement and contestation of power, and appropriation of value.

Figure 15. Antonilson balances himself, one foot in the scraper at the edge of the bucket of the skip loader tractor and the other at the top of the cage grid, to load mixed plastics into *Recicle a Vida*'s truck at *Lixão da Estrutural*. September 2016.

Figure 16. Atop the bucket of a skip loader tractor, Antonilson unloads super sacks filled with mixed plastics into *Recicle a Vida*'s cage truck, throwing the empty sacks onto the ground for Cláudia do Beleléu, his wife, to collect at *Maciço*. September 2016.

Recicle a Vida processes on average 5-6 tons of materials per day, most of which are plastics. Its main source by far is *Lixão da Estrutural*. Its drivers make 2 trips a day to the dump from Monday to Thursday and then one trip on Fridays, carrying between 2.5 and 2.9 tonnes of mixed plastics per trip, or the equivalent of roughly 60 super sacks. Nonetheless, between 20-30% of the materials bought from brokers at *Lixão da Estrutural* are contaminants placed by waste pickers into the super sacks, sometimes accidentally, due to the impossibility of removing them or the rush to collect more recyclables, and others intentionally, to fill sacks faster and make them seem heavier. Tricks like this are not only used by waste pickers who specialise in reclaiming plastics. On one of my visits to *Lixão da Estrutural*, on a particularly dry winter day, I saw some waste pickers celebrating because a staff member of SLU-DF had agreed to moisturise the cardboard they had reclaimed using a water truck called to *Maciço* to help with dust control. These pickers sell cardboard by weight, mostly to *Capital Recicláveis*. Thus, this trick was an obvious attempt to get some extra money by selling cardboard weighted down with water. According to Edilberto, who picks waste at *Maciço*, "God sometimes also help us, sending money in the form of rain".

This trick sounds to me like an act of resistance by the waste pickers, using the materiality of recyclables and contaminants in their favour to disturb the recycling network by tampering with what is probably the one and only – albeit crucial – variable they have control over, i.e. quality. Sometimes they do not even reap the benefits of their ruse, since buyers like *Recicle a Vida* and *Capital Recicláveis* are aware of the artifice and apply unilateral discounts whenever the level of contaminants falls above a threshold they deem to be acceptable. Still, waste

pickers keep on doing it, and perhaps even more so, as if to state their power, though minimal, and to contest the asymmetrical power of others. As Scott observes, "most of the political life of subordinate groups is to be found neither in overt collective defiance of powerholders nor in complete hegemonic compliance, but in the vast territory between these two polar opposites" (1990:136). Their forms of resistance are based on everyday ordinary weapons such as "foot dragging, dissimulation, false compliance, pilfering, feigned ignorance, slander, arson, sabotage, and so forth" (Scott 1985:29). These subtle acts of insubordination can be as pervasive as open insubordination, but nevertheless do not threaten the established hierarchies and power dynamics, and consequently often provoke less stringent responses (Scott 1985). In any case, it is worth clarifying that buyers like *Recicle a Vida*, and even wholesalers like *Capital Recicláveis*, are themselves subject to discretionary discounts when trading recyclables with their clients. Hence, when *Recicle a Vida* applies unilateral discounts to brokers due to the high level of contamination in a given load it is not enforcing a sanction it has created, but rather attempting to pass along to its suppliers a burden sometimes imposed by its clients.

Upon arrival at the cooperative, *Recicle a Vida*'s drivers unload the contents of the cage truck onto the floor, near the base of an inclined conveyor belt sitting in a covered area outside the shed (see Figure 17). The process of unloading the truck is nearly as intriguing to watch as the process of loading it at *Lixão da Estrutural*. First, the driver parks the truck near the shed, unlocks and opens its back door, allowing materials sitting close to the door to slide onto the ground. Back at the steering wheel, he drives over the cooperative's front yard to gain some distance from the shed. The driver then reverses towards the shed, accelerating, before hitting the

brakes abruptly to force the materials out. He repeats this process a couple of times, until the truck is nearly empty. Any remaining contents are swept out with a squeegee.

Figure 17. *Recicle a Vida*'s cage truck is unloaded while plastics are pushed onto a conveyor belt outside the cooperative's shed. September 2016.

One or sometimes two people, usually women, work at *Abastecimento*, or feeding, the external area near the base of the conveyor belt where the materials are unloaded. Using a shovel and a squeegee they push materials onto the inclined conveyor belt which travels through a hole in the shed's front wall. On the other side of the wall, the belt becomes flat and stretches for some 30 metres atop a metallic platform where plastics are manually sorted. There are nine bottomless funnels on each side of the belt, distributed uniformly over its length, one in front of the other. These funnels debouch into super sacks hooked onto the ceiling of the ground floor below the metallic platform (see Figure 18). Each pair of funnels corresponds to a type of plastic, but not all plastic types have an allocated funnel, only those which are

most abundantly available. Rarer types of plastics are placed in buckets and sacks which lie behind the sorters. PET, however, merits not one but three out of the nine pairs of funnels, plus three buckets. Unlike bottles made of other plastic types, PET bottles are meticulously sub-sorted by colour and even according to their previous contents and the material from which their labels are made. Clear PET bottles are sorted into three different streams: bottles of fizzy drinks; bottles of cooking oil, known in the recycling market as *PET óleo*, or oil PET; and bottles wrapped in PVC heat-shrink sleeve labels, metonymically dubbed *Birinight* by waste pickers and sorters in Brasília, alluding to the name of a very popular local energy drink sold in a packaging with such characteristics. The first two – i.e. bottles of fizzy drinks and of cooking oil – have a dedicated pair of funnels, as do green PET bottles, commonly used as packaging for regional soft drinks. *Birinight* bottles, as well as blue bottles, often used as packaging for water, are placed in a bucket each. Opaque PET bottles, as well as those coming in other colours, which they intriguingly refer to as *PET lixo*, literally rubbish PET, are placed together in the same sack.

The extra care taken in classifying PET bottles attracted my attention, since it contrasted with the cooperative's normal sorting procedure. Other plastic types are only segregated by type, and not by colour or any other criteria. The different meanings and even nomenclatures which PET bottles are given according to their colour, contents and the material out of which their labels are made indicate that there is something about the materiality of bottles, pigments, remnants and labels that is worth investigating, due to interfering in the valuation of PET and, therefore, with its becoming a resource again. Since a resource "is a provisional assemblage of heterogeneous elements including materials, substances, technologies, discourses and

practices" (Li 2014:589), it is crucial to inquire whose interests these meanings represent, and how and why they come to prevail over others. While some of the reasons for such extra care were more immediately evident, others were only elucidated as I moved along the network. Initially, I turned to sorters in search of responses.

Figure 18. A super sack hooked to the ceiling beneath the metallic platform inside *Recicle a Vida*'s shed. September 2016.

Sorters, all of whom are female at *Recicle a Vida*, work along the conveyor belt, one per funnel (see Figure 19). They are paid by the piece, R$ 0.10 (USD 0.02) per kg of plastics sorted, regardless of type. Since each funnel corresponds to a plastic type, and given that some plastic types are more abundantly available than others, with PET corresponding to almost 50% of the plastics *Recicle a Vida*

processes in a month, sorters rotate positions on a daily basis, so as to guarantee that earnings are equitable. This payment arrangement demonstrates the fallacious nature of the belief prevalent among waste pickers at *Lixão da Estrutural* about the incidence of free-riding in collective work. Unlike what they imagine, cooperatives are not obliged to split their revenues equally among their members; instead, they can and in fact do agree on alternative payment arrangements based on productivity, so members have no incentive to free ride.

Figure 19. Sorters work beside funnels and along the conveyor belt at *Recicle a Vida*'s shed. September 2016.

The materiality of plastics guides sorters in their task. The Resin Identification Code (RIC), referred to in subsection 4.2, widely deployed in plastic packaging in Brazil and all over the world, is of little or no use to them. Sorters at

Recicle a Vida have developed their own methodology, and even terminology, for identifying different plastic types, relying mostly on their senses. They are usually able to discern different resin types just by glancing at them. If they have any doubts, sorters check the bottom of the packaging; however, they are not looking for the Resin Identification Code. They have figured out that PET bottles, for instance, have a central dot at their base, whilst those made of high density polyethylene (HDPE), or *Mangaba* as they call it – a resin that has similar applications to PET, therefore causing some confusion – have a diametric line. Sorters do not know the reason behind this difference, which relates to the bottle manufacturing process, but they know it is a reliable method for distinguishing PET from other resins, most importantly from HDPE.

Millar (2018) comments on similar techniques used by waste pickers at *Jardim Gramacho*, a now deactivated dumpsite on the outskirts of Rio de Janeiro. In her ethnographic account of waste picking as a form of living, she describes how waste pickers are able to quickly distinguish between different kinds of plastics by feel and sound, testing their resistance: "What Eva called 'thick plastic' (*plástico grosso*, or high-density polyethylene) remained rigid when pressed. In contrast, PET bottles could be dented but did not easily bounce back into shape." (2018:124 emphasis in original).

Wearing heavy duty gloves, sorters shuffle the packaging laying on the belt and retrieve items made with the plastic type which corresponds to the funnel where they are stationed. Sorters allocated at funnels where the flow of materials is not as intense are given the extra task of retrieving one of the plastic types to be placed in the buckets or sacks lying behind them. This is the case for sorters placed at the last

station, known as *Ponta* or tip, for instance, who are responsible not only for salvaging plastics that should have been retrieved at previous stations – which are then taken back to *Abastecimento* to have another run through the conveyor belt – but also for sorting *Birinight* and *PET lixo*. Whatever content is left on the belt is discharged into a refuse bucket and then taken back to *Lixão da Estrutural*.

When asked why PET bottles were sub-sorted into different streams, while other plastics were segregated only by type, sorters were not able to provide an answer. Only Cleusimar was able to elucidate some of the reasons for such further categorisation. According to him, *Recicle a Vida*'s processes are based around requirements made by the wholesalers with whom the cooperative does business. They demand that *PET óleo* is separated from clear PET bottles of fizzy drinks, and that PET bottles are segregated by colour. Although all of these bottles are made from PET, interestingly, their prices are different. *PET óleo*, green and blue PET bottles are worth less in the market than clear PET, the most sought after type of PET bottle. Clear PET bottles wrapped in PVC heat-shrink sleeve labels and bottles coming in colours other than green or blue, on the other hand, are valueless. Failure to properly sort PET according to these chromatic, content and label criteria can result in unilateral price discounts being applied by wholesalers.

Cleusimar explains that *PET óleo* requires an extra effort on the part of recycling companies since it is comparatively harder to wash oily bottles in preparation for recycling than bottles of fizzy drinks. It is worth emphasising here that recycling is a process of abstraction, and that the presence of contaminants lowers the quality of recyclables. Due to the chemical affinity between plastics and oil – after all, plastics are made from petroleum – *PET óleo* poses more risks to the

recycling process than PET bottles of fizzy drinks, which explains recycling companies' preference for the latter. As Crang et al. note, "secondary materials carry risks, some more than others, of contamination or poor quality control. If incorporated into the supply chain, poor-quality materials will threaten the tradability of the primary good and the reputation of that manufacturer" (2013:8). If the price difference for *PET óleo* is related to comparatively higher costs of recycling, for green and blue bottles it is associated with their reduced applicability once recycled compared to clear PET bottles, according to Cleusimar. He was not, however, able to explain why wholesalers will not purchase PET bottles dyed in colours other than green and blue or which are wrapped in PVC heat-shrink sleeve labels.

The situation with *PET lixo* had caught my attention from the early days of my fieldwork at *Recicle a Vida.* I was puzzled by the piles of super sacks and bales of PET bottles of assorted colours waiting indefinitely in the back yard (see Figure 20) whilst monochromatic bales of sorted clear, green and blue PET bottles were put in its front yard and traded nearly every week. I then learned through Cleusimar and Cláudia that there was no market for opaque PET bottles or for those dyed in colours other than green and blue, hence their designation as *PET lixo*, or rubbish PET. The nomenclature was as intriguing as the situation: how could PET, a widely recyclable plastic type, be considered waste? Cleusimar did not know why buyers had no interest in such bottles and blamed it on packaging producers, arguing that they "care only about economic and possibly aesthetic aspects when designing their products and, without any consideration for the environment, society or waste pickers, put packaging in the market that, despite arguably being recyclable, has no commercial value". Again according to him, the number of *PET lixo* bottles has increased

considerably since their first appearance in the market in the early 2000s. A growing number of products which used to be packed in high-density polyethylene (HDPE) flasks, like ketchup, shampoos and hair conditioners, are now found in opaque and coloured PET bottles. Cleusimar explains that such containers were widely recyclable when made from HDPE, regardless of colour, but are no longer being recycled since making the switch to PET if they are dyed in colours other than green or blue, or if they are made opaque rather than translucent, a natural characteristic of PET.

Although it was not entirely evident at that stage, I deemed it reasonable to assume that the reasons behind the *PET lixo* issue were associated with the materiality of pigments. This hypothesis, in any case, needed to be further investigated, since the prevention of the realization of the value of PET through its transformation from waste back into resource has both social and ecological consequences (Gille 2010:1054) which more often than not are felt by the most vulnerable. This was clear at *Recicle a Vida*, which offered its stock of *PET lixo* to wholesalers and recycling companies all over Brazil without success and, as a result, had accumulated 38 tonnes of the material, as of September 2016, representing an estimated loss of over R$ 30,000.00 (USD 7,812.00) if purchasing, transporting, sorting and baling costs are taken into account. Aiming to reduce losses associated with *PET lixo*, *Recicle a Vida* first stopped baling it and started piling it in sacks in its back yard instead. Losing hope of finding a buyer for this material, and tired of incurring costs due to it, the cooperative then decided to start dumping *PET lixo* back at *Lixão da Estrutural*.

This decision was taken during my fieldwork, and I questioned whether it was the most strategic and cost-efficient solution. Cleusimar said he would instruct brokers to tell waste pickers at *Lixão da Estrutural* to refrain from reclaiming bottles of *PET lixo*, but I doubted how effective this would be, based on waste pickers' common use of materials as weapons of resistance. I asked to join Renato, one of *Recicle a Vida*'s drivers, on his first trip to *Lixão da Estrutural* to dispose of *PET lixo*, so I was able to see first-hand the vicious cycle that the cooperative was creating by disposing of unwanted materials where most of its supply was sourced. The waste pickers went into a frenzy once Renato opened the back doors of the truck and they caught a glimpse of the load. Giving loud whoops of joy, they called to their friends and lined up behind and beside the truck body, waiting for Renato to operate the hydraulic ram. As Renato started the engine, preparing to return to *Recicle a Vida*, Cláudia do Beleléu, who was standing at a distance, waved at us, indicating that she wanted to have a word with Renato. Having seen everything, she told him: "You know these will all go back to you, right?" Renato replied, saying there was no market for these bottles. Cláudia do Beleléu shrugged her shoulders and, raising her eyebrows with an "I told you" expression, waved goodbye.

Figure 20. Bales of PET lixo at *Recicle a Vida*. September 2016.

As to wholesalers' refusal to buy PET bottles wrapped in PVC heat-shrink sleeve labels, or *Birinight*, Cleusimar first explained that these labels entered the packaging market only a couple of years ago, but are increasingly being used by producers, causing significant disruption in the recycling industry since PVC becomes a contaminant in the PET recycling process. Recycling companies commonly use decantation tanks to separate PET from other plastics ordinarily found in labels and caps, e.g. polypropylene (PP), since the former sinks and the later floats in water. However, since PVC and PET have a similar density, both sink. The main sorting technique used by recycling companies is therefore ineffective to separate PET from PVC. Since "the meanings of things, and things themselves, are stabilized or destabilized, negotiated or contested, within complex asymmetrical power

relations and resource inequalities" (Hudson 2004:457), instead of improving their methods, recycling companies prefer to avoid the hassle of dealing with the materiality of PVC contained in heat-shrink sleeve labels, and therefore do not buy *Birinight* bottles unless they are sleeveless. Confirming Gille's claim that "political struggles have been more and more about the distribution not of goods but of 'bads'" (2010:1053), recycling companies transfer to suppliers the task of implementing a refined sorting process, a procedure which is certainly key in the pursuit of their capital accumulation strategy. As Harvey contends, "capital accumulation is not only about the production and circulation of surpluses as surplus value. It is also about the appropriation of the assets of others" (2006a:95). Although commonly thought of in tangible terms, referring to wealth and land, the phenomenon of accumulation by dispossession may also cover assets such as time and labour appropriated through the hegemonic capacity of more powerful agents to "secure the 'broad-based consent' of allied and subordinate groups to prevailing relations of economic and political domination" (Sum and Jessop 2013:201).

If recycling companies can afford to choose which types of bottles they will buy, every bottle *Recicle a Vida* manages to sell makes a difference, especially because the cooperative incurs a cost in buying them from brokers. PET is not only the most widely available type of plastic in waste streams, it also commands the highest price per kilogram amongst plastics. Numerous cooperatives report that PET accounts for more than half of their monthly revenue, as is the case for *Recicle a Vida*. In order to salvage *Birinight* bottles, *Recicle a Vida* decided to give sorters an incentive to peel off the PVC sleeves. The cooperative pays sorters 5 times more per kilogram of sleeveless *Birinight*, i.e R$ 0.50 (USD 0.13), compared to the price

ordinarily paid for a kilogram of sorted recyclables, PET included, i.e. R$ 0.10 (USD 0.02). Hence, whenever they have a chance, sorters at *Ponta*, where *Birinight* bottles are reclaimed, manually strip off their labels using a kitchen knife that they leave on the edge of the conveyor belt. If the flow of materials on the conveyor belt is intense, however, sorters strip off the labels of *Birinight* bottles after work. *Recicle a Vida*, however, does not receive one penny more for sleeveless *Birinight* bottles. These are worth the same as clear PET, i.e. R$ 1.65/1.70 (USD 0.43), as of August 2016.

The fact that buyers consider *Birinight* bottles with PVC heat-shrink sleeve-labels as contaminants to PET bottles to the point of applying unilateral price discounts if suppliers mix these into their supplies, despite *Birinight* bottles also being made of PET, is an indication that the resourceness of materials is not essential or intrinsic, but rather assembled and made up (Li 2014). As the interaction between PET and PVC becomes interference (Hawkins 2011a), the thinghood of plastics is demonstrated (Bennett 2010b) and "the matter of politics" unveiled (Braun and Whatmore 2010:xvi) to the extent that *Birinight* bottles come to embody and represent the interests of powerful players in the recycling economy. When referring to these players, I do not have only recycling companies in mind, though. I am thinking mostly of manufacturers who, when designing their packaging, often assess only its recycl*ability* in theory, understood as a property of certain materials, without caring whether it is indeed being recycl*ed*, where recycling stands for a socioeconomic practice predicated on particular assemblages of capital, labour, space and time. As Gabrys, Hawkins and Michael contend, "plastics generate a series of causes or political reverberations that genuinely constitute modes of material politics, (…) set[ting] in motion relations between things that become sites of responsibility

and effect" (2013:4–5). In this chain of political reverberations, the main responsibility certainly lays with producers, though the burden is externalised and transferred to powerless agents in the recycling economy.

"Social institutions determine what wastes, and not just what resources, are considered valuable by society", and this determination is based on the materiality of wastes and on an asymmetric power "structure of rights and rules, which implies a certain distribution of advantages and disadvantages" (Gille 2010:1056), which has become clear in the case of *Birinight*, at least for now. Wholesalers' refusal to buy *Birinight* overburdens *Recicle a Vida*, who have comparatively limited means *vis-à-vis* other players to deal with the materiality of PVC heat-shrink sleeve labels and yet are subject to sanctions in case of non-compliance with requirements concerning the classification of PET. This signals the importance of continuing to investigate and reveal how the materiality of bottles becomes entangled with and affects the distribution of power among players in the PET recycling economy as a fundamental step towards empowering waste pickers.

7.3. "Selling lunch to buy dinner": (lack of) capital and its spatio-temporal constraints

Recicle a Vida does not possess a store of working capital; hence, its processes are dictated not only by the materiality of plastics, but also by concerns regarding turnaround, i.e. the time which elapses between paying brokers for the materials supplied, processing them, selling them and being paid by clients, which is intimately connected with the spatio-temporal organisation of the recycling economy. This section continues to explore *Recicle a Vida*'s internal modes of

operation; this time, however, emphasising aspects related to its financial situation in terms of its interconnectedness with the spatial embeddedness and temporal organisation of the PET recycling economy. It is grounded on the premise that "the spatiality of whatever subject you are looking at (…) shap[es] social relations and societal development just as much as social processes configure and give meaning to the human geographies or spatialities in which we live" (Soja 2010:3–4). This spatial situatedness of the nodes of a network, and the temporality that arises from relations between them, has important implications for their bargaining and negotiating capacity and for the maintenance of the power structure within the network (Coe et al. 2008).

Agenor, line manager at *Recicle a Vida*, oversees work at the conveyor belt from the ground floor, monitoring super sacks hooked to the ceiling of the platform to replace them once full. Sacks that have been filled are weighed and information concerning the type of plastic contained, the weight of the sack and the cooperative member responsible for sorting are registered by Cláudia, the operational manager, on a computer programme developed by Cleusimar to improve accounting and management of data. Once weighed, the sacks are placed in a storage area waiting to be baled. Four hydraulic presses installed alongside the metallic platform are used in the process of baling plastics (see Figure 21), one of which is exclusively dedicated to baling PET, due to it being the most abundantly available type of plastic processed by *Recicle a Vida*. Janilton, the most agile among the press operators, is responsible for the PET press (see Figure 22). Using a water tank, he progressively transfers PET bottles from super sacks to the press. Each bale contains around 5 super sacks and Janilton produces 8 bales per day, on average.

Figure 21. Interior of *Recicle a Vida*'s shed. At the back, the metallic platform on top of which the conveyor is installed. In the foreground, four presses for baling plastics with some super sacks filled with materials lying around them. September 2016.

Figure 22. Janilton takes a bale of clear PET bottles out of the press after banding it at *Recicle a Vida*'s shed. September 2016.

Like sorters, press operators receive a performance-based pay, at a rate of R$ 0.06 (USD 0.01) per kg of plastics baled. Hence, once bound, PET bottles are taken once more to the scale and have their weight printed on them in large numbers with ink, and recorded by Cláudia in *Recicle a Vida*'s digital accounting system. The bales are then transferred to *Recicle a Vida*'s front yard using a forklift, where they are piled awaiting to be sold (see Figure 23). Curiously, bales of green PET usually weigh less than bales of clear PET, at around 140 and 180kg each, respectively. The difference, according to members of *Recicle a Vida*, can be explained by the fact that green PET bottles are usually thicker than clear PET bottles, due to manufacturing differences, and therefore offer greater resistance to the press, which results in lighter bales.

Figure 23. Bales of clear PET bottles piled in *Recicle a Vida*'s front yard. September 2016.

By the end of every working day, Cláudia prints production reports and hands them in to Thaísa, administrative officer at *Recicle a Vida*, responsible for managing the cooperative's finances and controlling sales. Since *Recicle a Vida* does not have a working capital reserve, an important part of Thaísa's job is to make sure the cooperative has enough cash to pay the bills, its suppliers, and members, which entails keeping a close eye on its bank account to plan for sales. According to Thaísa: "We are constantly fighting fire here. We sell our lunch to buy dinner". Juggling the cooperative's finances is all the more complex because most of the PET which *Recicle a Vida* trades is delivered hundreds of kilometres away and, as a rule, the prices negotiated in the PET recycling market are 'delivered' prices, i.e. including delivery charges. In order to reduce transport costs, which are an important factor in the PET recycling market as a result of the combination of the materiality of PET bottles – lightweight and bulky – and of the spatiality of the PET recycling network – geographically capillary in its initial nodes and concentrated at its top – the cooperative only trades PET on a full truckload basis. Due to its financially constrained situation and to the prominent role of PET in its revenues, however, *Recicle a Vida*'s business observes a certain temporality. It is usually only able to wait until its stock of PET is nearing 6 tonnes, enough to fully load a 3-axle rigid lorry, or *toco* as this type of vehicle is popularly known in Brazil.

Cost-wise, it is often more attractive for the cooperative to sell higher volumes of PET, because the cost of shipping per unit falls when hiring bigger trucks. Sometimes *Recicle a Vida* does manage to fill an articulated lorry with over twice the capacity of a *toco*, i.e. around 13 tonnes (see Figure 24), which implies a

25% reduction of shipping costs per kg – from R$ 0.20/kg (USD 0.052) to R$ 0.15/kg (USD 0.039). To do this, it depends on other cooperatives affiliated to *Rede Alternativa*. Thaísa is in close contact with them to coordinate joint sales and therefore make the most of the carrying capacity of lorries. Because *Recicle a Vida* is the best endowed among the organisations affiliated to *Rede Alternativa*, it co-ordinates these sales. Some cooperatives affiliated to the network do not even have access to a press to bale materials, however. Despite providing infrastructural support to these cooperatives, upon payment of a fee to cover associated costs, *Recicle a Vida* is not in a position to completely centralise sales of *Rede Alternativa* due to its limited capacity.

The cooperative's manoeuvres to reduce the impact of shipping are not always successful, however. The first time I observed a truck being loaded at *Recicle a Vida*, its members were so eager to use the vehicle's carrying capacity as efficiently as possible that they ended up stacking bales of PET bottles too high. Concerned that the truck would topple, the freighter refused to take the consignment and demanded that they unloaded the shipment from his truck.

Figure 24. An articulated lorry fully loaded with bales of PET bottles in *Recicle a Vida*'s front yard. September 2016.

Once *Recicle a Vida* has enough material in stock to fully load a lorry, sometimes with the help of partner cooperatives, as previously mentioned, Thaísa contacts prospective buyers by phone to inquire as to their up-to-date prices. The PET recycling market is volatile, and is susceptible to shifts in the crude oil market, since virgin PET is produced from ethylene glycol, which is derived from crude oil, and terephthalic acid, so prices have to be constantly monitored. Sellers are usually responsible for arranging shipping, so once Thaísa secures a buyer for their stock of PET, she informs Cláudia in order to find a freighter. Inevitably, PET bottles are shipped to somewhere in the south or southeast of Brazil – most commonly the latter – where PET recycling companies are concentrated, both numerically and in terms of recycling capacity (see Chapter 9.2 for a detailed discussion of the spatio-temporal

organization of the PET recycling industry). In fact, it is not only recycling companies that are concentrated in these regions, but extractive and manufacturing industries as well (see Figure 25). Consequently, freighters that happen to be in the Brasília area are more likely to be delivering than collecting products, following a southeast-midwest directionality. Cláudia tries to take advantage of the fact that recyclables are often shipped in the counter-flow of production networks, phoning her contacts to inquire whether they are aware of any contractor looking for a return freight, i.e. travelling back to the region of their home or original point of departure, which is usually around production hubs in the south and southeast of the country. Contractors ordinarily charge a lower fee for return freights since the costs of returning were already accounted for when calculating the fee charged for the original delivery.

Figure 25. Spatial distribution of extractive and manufacturing industries in Brazil – 2016. Adapted from "Atlas Geográfico Escolar Digital", by IBGE – Instituto Brasileiro de Geografia e Estatística, 2018 [https://atlasescolar.ibge.gov.br/images/atlas/mapas_brasil/brasil_distribuicao_industrias.pdf].

Although seemingly beneficial to *Recicle a Vida*, the practice of charging a lower fee for return freights can be problematized as being as much a cause as it certainly is a consequence of the spatial concentration of the industry in Brazil. Harvey's considerations about the "locational dynamic" arising from capital accumulation are elucidative to my argument. He claims that, under capitalism, "new production tends to be drawn to existing production locations", which he designates as "'self-organizing' dynamics of concentration and centralization of capital in space" (Harvey 2006a:98). These major centres of production attract investments in

transport and communications infrastructure "because that is where they are likely to be most profitable"; consequently, "a powerful centripetal force is felt as uneven geographical investments in transport systems feed further uneven geographical developments" (Harvey 2006a:101). In this light, return freight becomes a mechanism which feeds and favours the spatial concentration of production and recycling activities, giving more impetus to this centripetal force, therefore contributing to the perpetuation of socioeconomic disparities among the nodes of the recycling network and of an uneven type of development where certain regions of the country reap more benefits than others, not to mention the environmental impacts associated with production/recycling systems being overly dependent on long-distance haulage.

Furniss (2015) observes a similar phenomenon and comments on its implications for contemporary recycling economies in his analysis of transnational waste flows, based on a case study of the Egypt-China PET trade. He mentions how the usual directionality of trade between the two countries – with manufactured goods commonly flowing from the Asian into the northern African country – affects the price of container space returning to China, which can be lowered to the point of becoming cheaper than sending a container from Egypt to Greece. As a consequence of lower shipping costs, as well as of the looser quality requirements which are also an element of Furniss' analysis, Egyptian PET sellers normally feel compelled to sell to Chinese buyers: "In an economic rather than kilometric geography of contemporary global maritime transport, Egypt has thus become closer to China than to Greece" (Furniss 2015:6). For Egyptian sellers, possibly in the same manner as for cooperatives like *Recicle a Vida*, the artificial geographical proximity between sellers

and buyers created via reduced shipping costs means the foreclosure of prospects of socioeconomic improvement through vertical upgrading in the recycling network. Incentives for decentralising production and recycling away from China, in the case analysed by Furniss, or the south and southeast of Brazil, in the case under consideration, are low or non-existent under such circumstances.

The cooperative's turbulent financial situation implies that it is often bound to sell to buyers who pay up front, a practice common only among wholesalers. Not coincidentally, at the time I was doing fieldwork, *Recicle a Vida* had three main trading partners in the PET recycling market, all of which were wholesalers: *Whargo*, based in Contagem, in the state of Minas Gerais; *RD Comércio, Serviços e Indústria*, and *Brasil Limpo*, both of which had dialling codes indicating that they were operating from the Federal District. *RD* and *Brasil Limpo* used to be competitors, but, during the time I spent at *Recicle a Vida*, Thaísa learned that their owners had become business partners, despite having an unstable relationship, according to her. Thus, technically, the cooperative had two trading partners in the PET recycling market. Compromising events involving *Whargo*, which happened during my fieldwork and will be discussed in Chapter 8, meant that *Recicle a Vida* suspended trade with this wholesaler and, thus, was left with a single PET trading partner.

Besides wholesaling recyclables, *Whargo* also produces PET flakes; therefore, when trading PET with them, *Recicle a Vida* sends the consignment to their warehouse for further processing. In contrast, the protocol with *Brasil Limpo* and *RD* was a lot more complex. Both of these companies are wholesalers of plastics who act as mere intermediaries in the PET market segment. Thaísa reports that, upon

buying a consignment, *Brasil Limpo* and *RD* would request that *Recicle a Vida* have it delivered straight to their client. However, because they did not want the cooperative to know who their clients were, they would only inform them of the city where the consignment of PET should be delivered, which often changed. They would disclose this information only because it was necessary for the cooperative to arrange a freighter. Nonetheless, Brazilian law requires freighters to be in possession of an invoice containing basic information about the transaction behind the shipment, i.e. the merchandise being transported, its price, the seller, the buyer, and their respective addresses. To avoid granting *Recicle a Vida* access to such documents, *Brasil Limpo* and *RD* would request the cooperative to phone them once the freighter had arrived at their shed, so that they could send an employee to hand in the invoice to the driver in person.

During the course of my fieldwork, however, *Brasil Limpo* and *RD* changed their policy. On certain occasions, they would send the invoice to *Recicle a Vida* via email, while still bringing it personally to hand it directly to the freight driver on many others. Thaísa was not sure at the time whether or not it was a coincidence, but all the invoices to which *Recicle a Vida* had access named the same client: *Itoplas*, a PET flake producing company based in Itobi, in the state of São Paulo. It was unclear to Thaísa what had motivated this change in behaviour on the part of *Brasil Limpo* and *RD*, but she thought it was curious that it had happened around the same time *Recicle a Vida* found out that the two companies had established a partnership to acquire plastics. The reason for this change became clear to me as the research progressed, and shall be discussed in Chapter 9. According to Thaísa, however, the

phone number for *Itoplas* which was available online did not work, and they could not find any other contact information to reach the company. It was a dead-end.

Keen to bypass wholesalers and trade directly with recycling companies to get better prices, Cleusimar, Mônica and Thaísa regularly used their craftiness to try to overcome the hurdles posed by *Brasil Limpo* and *RD* to accessing market information. They would often wait for the wholesaler's employee to leave and would then kindly invite the driver for coffee while the cooperative's members loaded the lorry. Starting off with some small talk, they would attempt to obtain information about the recycling companies with whom *Brasil Limpo* and *RD* maintained business. Once, Cleusimar and Mônica even followed a driver until he stopped at a gas station, just to try and find out where he was heading. Their attempts were successful at times, but they still faced challenges to trading directly with recycling companies. Thaísa, as well as representatives of other cooperatives with whom I talked, told me that wholesalers often have "dodgy arrangements with recycling companies", implying that they engaged in both legal and illegal practices, seeking mutual advantage, which made direct trade difficult.

To illustrate her point, Thaísa mentioned one occasion on which she managed to find out the recycling company to whom *RD* had sold PET bought from *Recicle a Vida* and, upon contacting the company to inquire about their price, was asked by the respondent how she got their number, claiming that the company had a restricted list of business partners. Opportunistically, this employee said they would make an exception on that occasion, and invited *Recicle a Vida* to send a consignment of PET for quality assessment, offering a price below the market value and promising to pay a couple of days after delivery. Not only was this proposal

financially uninteresting, it was also too risky. Cases abound in the PET recycling market of cooperatives which, tempted by the offer of a better price – which in this case was not even on offer – were left without either money or materials after doing business with a new party who was located a long distance away, making it hard for them to complain or take any measures in case of default. *Recicle a Vida* has had an unpleasant experience like this in the past which left the cooperative in financial hardship without money to pay its members for their work. Hence, they were not willing to take the risk.

The spatio-temporality implied by the payment policy of more established PET recycling companies is also an obstacle preventing *Recicle a Vida* from trading directly with them. As a rule, recycling companies do not pay suppliers until four days or so after delivery, which gives them enough time to assess the quality of the materials procured, and then eventually apply unilateral price discounts if contaminants are above a level they deem acceptable, usually over 30%. Furthermore, since recycling companies are geographically concentrated in the south and southeast of Brazil, the wait is actually longer when shipping time is accounted for. Hence, sellers must have enough working capital not only to pay freight costs – borne by sellers as market praxis – but also to maintain their businesses while bottles are in transit and, once they are delivered, until recycling companies process and assess them. This, however, is not the reality for most cooperatives and associations of waste pickers in Brazil, not least for *Recicle a Vida*. Over 60% of the 591 collectives of waste pickers surveyed nationally by IPEA (2016) indicated that they faced issues trading recyclables, the lack of access to working capital being identified

as one of the main difficulties of commercialization, along with inadequate infrastructure and high transportation costs.

From the perspective of capital, under its basic law of accumulation, pressures "to minimize the turnover time of capital and (…) speed up production, marketing and consumption" may have resulted in an annihilation of space through time via "reductions in the cost and time of movement of commodities, people (labor power), money and information" (Harvey 2006a:100), which have allowed companies to extend their market reach. The idea of the annihilation of space through time stems from a longitudinal comparison of economic activities around the globe, both pre- and post-Industrial Revolution, centred around time and based on the observation that we can now transpose distance much faster than we used to when we relied, for instance, on horses to pull stagecoaches and on waterwheels to produce certain goods. However, Doreen Massey rightly notes that not all of us experience such time-space compression the same way, since this phenomenon is subject to a power geometry according to which different social groups experience movement differently: "some people are more in charge of it than others; some initiate flows and movement, others don't; some are more on the receiving-end of it than others; some are effectively imprisoned by it" (1994:149).

Following Massey's line of thought, but pushing her argument a bit further, I propose that, from the vantage point of labour, pressures resulting from the logic of capital accumulation have prompted a dilation of time through space. If we centre our analysis around space, we observe that we are going further than we used to in the past, as a natural consequence of the spatial concentration that stems from the process of capital accumulation. Activities which used to be – or at least could be –

executed locally are now taking new forms and stretching out in space. This process of going further, though, even if faster, often implies spending comparatively longer periods of time moving and on the move, at least as concerns the physical movement of people and things. From the point of view of underprivileged segments of the population, though, more time spent moving can be onerous and even prohibitive at times, if access to their means of subsistence is at stake. That is precisely the case with *Recicle a Vida* when attempting to trade directly with recycling companies. The distance between them implies a longer turnover time for capital, compared to the upfront payment of wholesalers, which is exacerbated by the deferred payment policy commonly enforced by recycling companies. Without a working capital reserve, *Recicle a Vida* has a high discount rate for the future, and is not in a position to accept deferred payment, especially when selling PET, which makes up nearly 70% of its revenue. Financially constrained, the cooperative's "demands on the present [are] too extreme to warrant sacrificial investment in a highly uncertain future" (Wood 2003:464), made yet more uncertain by the risks that space entails; what if cargo is stolen in transit or buyers default on payment?

This subsection has explored some of the strategies used by *Recicle a Vida* to deal with the spatial organisation of the PET recycling economy and to minimise the subsequent impact on the cooperative's operation in light of its financial constraints which imposes a certain temporality to its business. It has examined how standard practices and policies enforced by wholesalers and recycling companies concerning freight and payment, for instance, severely undermine the cooperative's trading prospects, particularly as concerns direct trade with recycling companies. In light of the spatio-temporal organisation of the PET recycling economy and its lack

of working capital, *Recicle a Vida* is better off relying on wholesalers like *Whargo*, *Brasil Limpo* and *RD* to trade PET, despite the limitations that such reliance imposes on its capacity to capture value.

8. *WHARGO*: HOW GOODS AND SERVICES TAX SHAPES THE PET RECYCLING ECONOMY

Based on their seemingly higher levels of transparency, I initially chose to follow PET bottles to *Whargo*, one of the three wholesalers with whom *Recicle a Vida* trades in the PET recycling market. Judging from the negotiations with *Recicle a Vida* I had witnessed, I anticipated that it would be easier to negotiate access with *Whargo* than with *Brasil Limpo* and *RD*. Using the number provided by *Recicle a Vida*, I called them to try to arrange a visit, giving a brief explanation of my research. On my first call, I had the impression that the speaker was being slippery, as if he was trying to avoid talking to me. He asked me to call later, saying the person in charge was busy, but when I did, he told me his supervisor had already left and asked me to call the next day. When I called *Whargo* the next morning, he told me that only the owners of the company would be able to answer my queries and grant me permission to visit the company's plant, but according to him they were on leave and had no date set for their return. It all sounded very suspicious. Changing strategy, I decided to survey the web, trying to find contact details for *Whargo*'s owners, hoping that by talking to them directly I could more easily schedule an interview and obtain their consent to visit *Whargo*'s plant.

To my complete surprise, the first search result returned by Google was a piece of news dated just three days before, reporting that the owners of *Whargo* had been arrested for money laundering and tax evasion following the investigations of a task force entitled *Operação Flake* (R7 2016). The employee's reluctance to provide me with precise information about the company's owners suddenly made sense. With

a police operation underway, *Whargo* seemed like a dead end. Its staff members were probably under too much stress already, fearing that whatever they said could have implications for the company and their jobs. My experience on the phone discouraged me from persisting in trying to obtain access; negotiating with *Brasil Limpo* or *RD* would most likely be easier and would probably lead to more thorough information, despite their seemingly protectionist practices. As Chacko notes, "good planning is critical, but even with careful arrangements and organisation, successful fieldwork requires flexibility, a capacity to adjust to unexpected situations and competent juggling of diverse identities in varied situations" (2004:53). Imbued with such flexibility, I reconsidered my plans and decided to contact *Brasil Limpo* instead.

That is not to say, however, that *Whargo* did not become a key source of information for my research. I may not have been able to produce primary data related to the company, but being in the headlines, it was easy to find secondary data about it. The whole scandal involving *Whargo* provided rich analytical input to this thesis, being an opportunity to problematize distortions caused by the Brazilian tax system in terms of the meaning ascribed to PET bottles as post-consumer recyclables and the territorial embeddedness of the PET recycling economy. This section addresses these issues and aims to demonstrate that, besides imposing an undue burden on the recycling economy by taxing recyclable materials which are used as inputs in industrial processes, the tax system in Brazil provides a motivation for companies to source their supplies outside their host state, reinforcing the position of the southeast and south of the country as an industrial hub, thus strengthening vicious dependency ties across regions. Before proceeding, I should clarify that I am particularly interested in transactions involving raw materials and intermediate

products, i.e. transactions between companies in a production/recycling network. Transactions involving consumers of finished products are subject to a specific regime, which is beyond the scope of this thesis.

Following on from my initial online research about *Whargo*'s owners, I found a press release from the local police department giving more detail about *Operação Flake*. According to this report, there was strong evidence that *Whargo* had set up over 15 shell companies in different states, using figureheads registered as directors with the purpose of laundering money and evading ICMS (*Imposto sobre a Circulação de Mercadorias e Serviços*), a type of value added tax levied on the circulation of goods – post-consumer recyclables included – and on communication and transportation services. These bogus traders worked like invoice mills (Keen and Smith 2007), pretending to sell recyclables to *Whargo* and issuing a corresponding invoice as if they had collected VAT on these sales, but would disappear or engineer bankruptcy without truly remitting taxes to public authorities. *Whargo* would then credit the VAT supposedly charged on its fraudulent purchases from bogus traders against the VAT it is liable to pay on sales, allegedly resulting in an evasion of over R$ 100MM (USD 26.3MM) in ICMS. Through this mechanism, *Whargo* was able to sell recyclables for a more competitive price while also increasing its profit margins. Not by chance, the investigations into the company were triggered by an anonymous complaint, most likely a competitor adversely affected by the wholesaler's unfair practices. Nonetheless, my impression after fieldwork was that rent-seeking practices based on tax evasion, such as the perpetrated by *Whargo*, were the rule in the market, rather than an exception.

Operação Flake brings to light at least two contentious aspects of the ICMS legislation that are worth examining based on the distortions to the PET recycling economy that arise from them: the classification of post-consumer recyclables as goods; and the logic behind setting different tax rates based on the state of origin and destination of goods. Concerning the first of these aspects, it should be noted that, despite improvements in the quality of post-consumer recycled PET triggered by advances in recycling technology, as a rule, producers still prefer virgin materials due to their higher level of predictability. "The crux of all recycling activity (…) is that the industry has no control over the quality of goods entering the supply chain. Rather, this is a supply chain of goods already made – a legacy of past manufacturing processes rather than of manufacturing to produce a quality controlled product for sale" (Gregson et al. 2013:5). This exposes companies willing to incorporate such materials in their processes to risks related to the poor quality of their inputs, which more often than not results in them prioritizing virgin materials, especially if there is no price incentive for them to opt for recycled inputs.

Hence, the classification of post-consumer recyclables – including discarded PET bottles and the inputs made from them – as goods for the purposes of ICMS works as a disincentive to the use of recycled materials vis-à-vis their virgin counterparts, encumbering the recycling process by making it unnecessarily costlier. The effects of such practices are manifold. For one, it interferes in the value appropriation dynamics in the recycling economy, forcing agents to reduce their profit margins to increase the competitiveness of recycled materials against virgin. Since the PET recycling market has an oligopsonic structure (see subsection 9.2), i.e. it is composed by a few large buyers who can therefore exert a great deal of control

over prices and the overall terms and conditions of sale, profit margins are mostly squeezed in the early and more labour-intensive stages of the recycling process. Businesses' resistance to reducing profit margins may, however, result in the ICMS legislation having the side effect of encouraging tax avoidance practices as an alternative to make recycled materials more competitive than virgin. The levying of ICMS on post-consumer recycled materials, hence, has the indirect effect of promoting the plastics industry and contributing to the production of more plastics – as if our Plastic Age has not already produced enough – with deleterious consequences for the environment and for human health.

This practice also acts as an incentive for businesses to continue to operate informally, i.e. in an unregulated manner, therefore avoiding taxes, which is particularly pronounced in industries, such as recycling, which already have high levels of informality. For collectives of waste pickers, for instance, most of whom earn just enough to pay for their living expenses and those of their family members, regularizing their business implies a reduction of their already limited income due to the duty to pay taxes, among which is ICMS on the sale of recyclables. Finally, since recycling companies usually have more stringent accounting systems than wholesalers, the ICMS legislation creates a barrier to direct trade between recycling companies and waste pickers, most of whom are informal workers. According to an informant interviewed in the course of my fieldwork, "recycling companies play by stiffer rules, whereas wholesalers enjoy more flexibility when negotiating in the market", insinuating that the latter could more easily circumvent the ICMS rules, with *Whargo* being an illustrative example, although similar anecdotes abound in the market.

Spatial aspects associated with how ICMS is charged – with rates varying according to where seller and buyer are located in the territory – also have implications for the PET recycling economy, making trade with certain agents more attractive than with others. In fact, research participants have reportedly mentioned ICMS rates as a factor influencing their choice of trading partner based on their location. To understand that, we must make a brief incursion into the legal framework regulating ICMS. According to the Brazilian Constitution (clause 155), ICMS is a state tax, i.e. a tax paid to the government of a state rather than to the national government, and not by the Federal Government. Among other circumstances irrelevant to the present study, the sale of merchandise from a business establishment – be it an intermediary or a final product – and the provision of an inter-state or inter-city transportation service are taxable events for the purposes of ICMS (clause 12, Complementary Law 87/96). Hence, once PET bottles are reclaimed by waste pickers and sold to a business establishment, this and every subsequent transaction entailing their circulation within or outwith a state is an ICMS taxable event. ICMS, however, is non-cumulative, meaning that taxes paid in previous phases of the production process should be accounted for and compensated when calculating the tax due in every subsequent transaction, even if paid to a different state. As a rule, ICMS is due to the state where the goods or services originate from, as opposed to the state where they are sold to or consumed, though there are some exceptions.

Although states enjoy some degree of autonomy regarding the regulation of the tax in their territory, particularly as concerns rates, there are some general rules, two of which are particularly intriguing. First, internal rates, which are applicable to

transactions within a state (see grey cells in Table 2), cannot be lower than inter-state rates. Second, inter-state rates, which are determined by the Brazilian Senate and currently stand at 12% – as per Senate Resolution 22 of 1989 – are lower when transactions originate from the southeast and south – with an exception for the state of Espírito Santo, an outlier among the states of these regions – having the north, northeast, mid-west or the south-eastern state of Espírito Santo as a destination, at a rate of 7% (see yellow cells in Table 2).

Table 2

ICMS Inter-state and Internal Rates - Brazil, 2017

INTERNAL RATE			DESTINATION																									
			NORTH							NORTHEAST									MIDWEST				SOUTHEAST				SOUTH		
			AC	AM	AP	PA	TO	RO	RR	AL	BA	CE	MA	PE	PI	PB	RN	SE	DF	GO	MS	MT	ES	MG	RJ	SP	PR	SC	RS
ORIGIN	NORTH	AC	17	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
		AM	12	18	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
		AP	12	12	18	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
		PA	12	12	12	17	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
		TO	12	12	12	12	18	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
		RO	12	12	12	12	12	18	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
		RR	12	12	12	12	12	12	17	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	NORTHEAST	AL	12	12	12	12	12	12	12	18	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
		BA	12	12	12	12	12	12	12	12	18	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
		CE	12	12	12	12	12	12	12	12	12	18	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
		MA	12	12	12	12	12	12	12	12	12	12	18	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
		PE	12	12	12	12	12	12	12	12	12	12	12	18	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
		PI	12	12	12	12	12	12	12	12	12	12	12	12	18	12	12	12	12	12	12	12	12	12	12	12	12	12	12
		PB	12	12	12	12	12	12	12	12	12	12	12	12	12	18	12	12	12	12	12	12	12	12	12	12	12	12	12
		RN	12	12	12	12	12	12	12	12	12	12	12	12	12	12	18	12	12	12	12	12	12	12	12	12	12	12	12
		SE	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	18	12	12	12	12	12	12	12	12	12	12	12
	MIDWEST	DF	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	18	12	12	12	12	12	12	12	12	12	12
		GO	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	17	12	12	12	12	12	12	12	12	12
		MS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	17	12	12	12	12	12	12	12	12
		MT	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	17	12	12	12	12	12	12	12
	SOUTHEAST	ES	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	17	12	12	12	12	12	12
		MG	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	18	12	12	12	12	12
		RJ	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	12	20	12	12	12	12
		SP	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	12	12	18	12	12	12
	SOUTH	PR	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	12	12	12	18	12	12
		SC	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	12	12	12	12	17	12
		RS	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	12	12	12	12	12	18

Note. Adapted from *Alíquotas internas 2019: Tabela de alíquotas internas e interestaduais atualizada com majoração das alíquotas internas*, by Contabilidade no Brasil, retrieved from https://www.contabilidadenobrasil.com.br/aliquotas-internas-2016/, accessed on 30/09/2017.

The legislators' intent when determining that internal rates should not be lower than inter-state rates seems to have been to guarantee that products originating from outwith a state would not face less favourable treatment than those produced within it, as if reproducing the free trade logic of the General Agreement on Tariffs and Trade (GATT). Although such logic is widely accepted by countries engaged in international trade relations, it is highly contentious from a sustainability perspective. Instead of incentivising local-based production, reducing the tax burden on locally-sourced products/inputs, the ICMS legislation can lead to businesses having an incentive to procure from suppliers based outside their host state, i.e. where their plants are located, in order to take advantage of lower ICMS rates. Since suppliers of post-consumer recyclables are to be found almost in every urban settlement around the country – unlike natural resources, which are site-specific – this behaviour is particularly likely in the recycling economy and is notably pronounced in the context of neighbouring states, in cases where the price of inputs before taxes is fairly similar. Under such circumstances, although shipping costs will probably be about the same, ICMS rates can vary considerably depending on whether the supplier is based on one side or the other of a border. Even when states are not neighbouring, it can be the case that shipping inputs from another state is more attractive than procuring them in the host state, if differences in the price and the tax rate are wide enough to compensate for shipping costs; and it is worth remembering that internal rates can be up to 11 percentage points higher than inter-state rates, as per the general rule.

Yet more problematic, buying from sellers based in certain states is comparatively more attractive from a tax point of view than buying from others. The

inter-state rate for transactions originating from the six most developed states of Brazil, all located in the south and southeast, and with a destination in any of the other 20 states, plus the Federal District, is lower than the normal inter-state rate of 12%. Probably intended as a mechanism to make goods produced in the south and southeast – where most Brazilian industries are located – more accessible to consumers living in other parts of the country, this rule has the pernicious side effect of perpetuating regional disparities, cementing the industrial preponderance of these two regions and the dependence of the north, northeast and mid-west upon them. If the ICMS law directly contributes to industries having an incentive to become concentrated in the south and southeast, then it is indirectly responsible for the fact that recycling companies, who supply inputs for industries, are also attracted to these regions. “Uneven development arises for the most part from geographical concentration, from dynamic and expansive urban agglomerations that persistently build on their own initial advantages” (Soja, 2010:63).

Instead of counteracting this process, setting lower inter-state rates for transactions originating from less developed states in order to encourage companies to relocate or decentralise their activities and attract investments that would contribute to the improvement of the infrastructure in these states, the legislation does the opposite, privileging states with already established competitive advantages and therefore reinforcing an uneven development model between member states. Industries which are located in the north, northeast and mid-west are further encouraged to procure supplies from companies based in the south and southeast, due to lower tax rates, which hinders the development of an endogenous symbiotic industrial ecosystem. The result is an economy which is heavily reliant on

transportation, since both the production and recycling ends of the network are concentrated in the same part of the territory, which contributes to increase its carbon footprint, the costs of which are certainly not accounted for. Not least, these imbalances translate into a power asymmetry between players in the PET recycling economy, with those based in rich states having a privileged position.

The ICMS legal framework has been under fierce scrutiny for a while, mostly on the basis of the destructive fiscal war to which it gives rise, prompting states to grant fiscal incentives to attract companies to their territory, often in defiance of the law. According to Complementary Law 24/75, ICMS-related fiscal incentives must be unanimously agreed upon beforehand with every other Brazilian state. Despite not being legally permitted to grant benefits at their own discretion, states frequently have done and continue to do so. There are currently two bills under consideration in the Brazilian Senate aiming to correct some of these distortions, one of which is directly related to recyclables. The draft amendment to Constitution n.1/2012 proposes to grant tax immunity to products made with recycled or reclaimed material, while draft Senate Resolution n.1/2013 proposes to unify inter-state ICMS rates at 4%. Both drafts, however, have stalled due to lack of political support. The scandal involving *Whargo* was unfortunately not enough to give new impetus to these propositions.

As this chapter has demonstrated, the ICMS legislation gives rise to a number of contradictions, being implicated in the perpetuation of ‘informal’ unregulated working arrangements among waste pickers and creating the necessity for a buffer between the extremes of the recycling network, i.e. waste pickers and recycling companies, therefore allowing the so-called ‘informal’ and ‘formal’ sectors

to work together. It further discourages recycling, reinforces the spatial concentration of production, and contributes to the over-reliance of production networks on transportation. Until legislative progress is made on this front to correct such inconsistencies, the ICMS legal framework will continue to provide sustenance to an uneven development model based on a linear and accumulative economic logic which grants virgin materials a comparative advantage over their recycled counterparts and privileges market players located in the south and southeast of Brazil to the detriment of those based in less developed regions of the country, being therefore particularly harmful to waste pickers in these underprivileged areas.

9. *BRASIL LIMPO*: SMALL COMPANY, BIG BUSINESS

Learning from my experience with *Whargo*, and based on the care both *Brasil Limpo* and *RD* seemed to take not to disclose information about certain aspects of their operation as wholesalers in the PET recycling market, I was convinced that the best strategy would be to try to obtain the contact details of the partners of these companies to negotiate research access directly with them, instead of calling one of their employees using the number provided by *Recicle a Vida*. This was not an easy task, however, since *Brasil Limpo* and *RD* did not have an online presence. Through Thaísa, I managed to obtain *Brasil Limpo*'s registration number and, with that, I was able to get an online copy of their certificate of incorporation which indicated the address of the company and the name of its owner: Ivan. I could not recall that name emerging in any of the conversations I had had while in the field thus far. *Brasil Limpo* was based in Anápolis, in the state of Goiás, 150km away from the Federal District. I knew, however, that the wholesaler had a physical presence in the Federal District, due to the protocol adopted to hand the invoice to the freight driver when trading with *Recicle a Vida.* Neither my informants nor my desk-based research were able to inform me of where *Brasil Limpo*'s warehouse/office in the Federal District was.

Facing a stalemate in my research, I supposed that perhaps other wholesalers operating in the region would be able to lead me to the owners of either *Brasil Limpo* or *RD. Capital Recicláveis* was the first alternative that occurred to me, not only because it is a key player in the local recycling economy, but because I already had the contact details for Jair, one of the owners of the company. I

scheduled an interview with him and visited *Capital Recicláveis*' warehouse near *Lixão da Estrutural.* It was interesting to see the scale at which they operate, compared to that of waste pickers at the dump and at *Recicle a Vida*. Most importantly, though, through Jair I finally managed to obtain the phone number of Ivan, owner of *Brasil Limpo*, to whom he referred as "one of the main wholesalers of plastics in Brazil".

I called Ivan, who agreed to meet me at *Brasil Limpo*'s office, located in a small commercial building just outside *Plano Piloto* on the way to *Lixão da Estrutural*. Challenging my preconceptions and expectations, I was warmly welcomed into a nicely decorated air-conditioned office by Ivan's secretary. Based on my experience visiting other wholesalers and on the scarce information I was able to gather about the company, I had assumed that *Brasil Limpo* would have a fairly big, though modest and somewhat messy warehouse, with some loose recyclables lying on the floor around piles of bales; nothing like what I encountered there. Ivan was in a call, but did not take long to invite me into his office. I briefly told him about my research, explaining that I was following PET bottles reclaimed at *Lixão da Estrutural* in order to understand how the recycling economy was organised in Brazil, which brought me to speak to him. I was not entirely open about the ultimate aim motivating my research because I anticipated that revealing my intention to contribute to the empowerment of waste pickers would cause him to reconsider participating or to filter his answers, more than he already would.

Looking back, I am not sure to what extent my behaviour was influenced by the perception that waste pickers with whom I interacted had of wholesalers. Despite maintaining a friendly relationship with them, my impression was that waste pickers

somehow blamed wholesalers for their poor socioeconomic condition, most likely due to wholesalers making a profit by brokering the materials they reclaimed. Although committed to offering a much broader analysis of the roots of waste pickers' socioeconomic deprivation, problematizing it on the basis of an exploration of the recycling economy, I think that I was likely imbued with a reductionist logic when approaching *Brasil Limpo*, also seeing them as one of the main culprits behind waste pickers' poverty. The more the research progressed, however, the more it became clear that wholesalers are only a part of an economic engine based on asymmetrical power relations, which nevertheless does not exempt them from their share of responsibility in perpetuating such asymmetry.

Ivan did not make any remarks about my research, but seemed to be flattered by my interest in what he had to say, and proudly shared information about his business operations. This chapter delves into aspects of this interview, as well as a conversation I had with Valéria, a procurement officer at *Brasil Limpo*. The first section explores some of the wholesaler's governance mechanisms, with a particularly focus on its political and semiotic strategies to secure supply, as well as spatio-material practices to maintain its position as a main player in the PET recycling economy. The second section turns to the spatio-temporal organisation of the PET recycling economy to discuss how it interferes with the meanings of discarded PET bottles and its potential to become a resource again, also delimiting the people and places that can participate in the market.

9.1. "They are constantly in debt with us": Wholesaling business strategies and governance practices to secure supply and increase profit

A wholesaler of post-consumer plastics, more specifically of PET, HDPE and PP, *Brasil Limpo* handles between 3,000-4,000 tonnes of plastics per month, with PET alone corresponding to around 60% of this volume. Its plastics supply capacity contrasts widely with that of the nodes in the recycling network which we have examined so far: it has approximately 4,000 times the supply capacity of an average waste picker at *Lixão da Estrutural* (around 1 tonne/month), and 40 times that of *Recicle a Vida* (around 100 tonnes/month). In this section, I draw on some of *Brasil Limpo*'s strategies and governance practices, which guarantee its position as one of the – if not *the* – biggest wholesalers of plastics in Brazil. I will focus primarily on the political-semiotic devices used by *Brasil Limpo* to secure supply drawing on some of the declarations made by *Brasil Limpo*'s owner, Ivan, and procurement officer, Valéria, which disclose how certain discursive aspects of the wholesalers' practices "instantiate, reflect, and refract power relations and contribute to domination and hegemony" (Sum and Jessop 2013:34–35). I will also examine some of the practices *Brasil Limpo* uses to confront the materiality of plastics, mainly PET, and deal with the spatiality and temporality of the recycling economy, therefore increasing its profit margins and reducing the risk of its business.

To further evince the size of his enterprise, Ivan praises himself on being "responsible for the creation of over 3,000 indirect jobs", referring to the members of cooperatives and associations, most of which informal, who sell recyclables to *Brasil Limpo*. His remarks corroborate the theoretical assumption of this thesis with regards to the mutual interdependence between the so-called informal and formal sectors of

the economy. If on the one hand, *Brasil Limpo* could be said to have created over 3,000 indirect jobs, on another it is arguably responsible for the informalisation of around 3,000 workers, who therefore cannot enjoy the benefits of formal employment, such as access to social security benefits. Thus, the indirect jobs discourse merely serves the purpose of naturalising and stabilising a system of exploitation and domination (Sum and Jessop 2013). As argued previously, informality is not in fact alienation from the formal economy; instead it should be understood as a dynamic of adverse incorporation, where the very participation in the economy reinforces "the limits on workers' prospects for longer-term security and accumulation and perpetuate their vulnerability" (Phillips 2011:391).

Although *Brasil Limpo* has no legal obligation to these 3,000 workers, as they are technically not its employees, according to Ivan the organisations where they work are "tied to the company through agreements, loans, cash advances and favours". Such mechanisms are commonly deployed by wholesalers to secure supply, as widely described in the literature (Lima et al. 2011; Maciel et al. 2011; Pereira and Goes 2016; Rutkowski 2013). Valéria, procurement officer at *Brasil Limpo*, whom I also interviewed on a separate occasion, justified the practice, adding that "most suppliers are auctioneers and sell to whoever offers the best price. The loyalty of most of our long lasting suppliers derives from the fact that we always give them money in advance, so they are constantly in debt with us". Valéria's statement was natural and spontaneous and provided me with food for thought. As Flores Berard and Holzscheiter contend, "discourses in themselves act as powerful structures of social conventions (meaning-making) by limiting the potentially indefinite ways of talking about and perceiving social and material reality"

(2011:141). Her words seemed to reveal that the practice she and Ivan referred to was so ingrained in the structure of the recycling economy that people have lost the capacity of critically appraising it.

I was particularly intrigued by Valéria's use of the word 'loyalty' (*fidelidade*). She really seemed to believe that by advancing money to waste pickers, therefore creating a creditor-debtor relationship, *Brasil Limpo* was earning their loyalty. Apparently, though, what the company was really looking for was subservience. I believe that what Valéria portrays as loyalty could be more accurately described as dependency, since loyalty is grounded on trust and requires a degree of reciprocity, and neither of these elements are verifiable in this case. Ivan's use of the word "tied" (*atrelados*) when referring to how waste pickers relate to *Brasil Limpo* supports my claim. I also could not avoid feeling uncomfortable when Valéria referred to waste pickers as "auctioneers" (*leiloeiros*), although I do agree that most of them actually behave like that – as do most players in a market, who tend to seek the best price. I am not entirely sure how *Brasil Limpo*'s market practices were any different from the standard market practice to the point of Valéria being able to accuse others of being auctioneers, without deserving an equally derogatory designation herself.

In that respect, although Valéria's designation of waste pickers as "auctioneers" could make one think that the PET recycling network observed a market type of governance, according to the Global Value Chain governance typology developed by Gereffi et al. (2005), the dependency ties nurtured by the latter in its relationship with suppliers makes the governance structure of the PET recycling network more closely aligned with the captive type. In other recycling

networks, such as for used clothing and end-of-life merchant ships, the presence in the market of intermediaries with a high-level of technical and market competence gives rise to a relational type of governance based on mutual dependence, as observed by Crang et al. (2013). Unlike them, the PET recycling network in Brazil is distinctively marked by attempts to lock-in suppliers, not because of the complexity of product specifications, though, but because of the high levels of power asymmetry between suppliers and buyers. It is worth noting that, in recycling networks, governance emerges not only from lead firms – as shall be discussed in subsection 10.1 –, but also from the middle, i.e. from the agents intermediating transactions between suppliers and recyclers as it is clear from *Brasil Limpo*'s practices, although in the cases examined by Crang et al. (2013) it emerges exclusively from the middle. This characteristic makes them distinct from the production networks commonly found in the literature.

Brasil Limpo's conglomerate grew considerably during the economic crisis that hit Brazil around 2010. According to Ivan, "while our competitors were drowning in debt, we were able to remain financially stable and to fulfil agreements". For the wholesaler, the crisis meant an opportunity to consolidate its reputation and to expand its trade network. Being able to pay suppliers up front meant the company had an advantage over competitors in times of shortage of materials in the market. As Valéria explains: "Every year we go through the same rollercoaster during winter. Availability of bottles decreases due to reduced consumption of bottled beverages. There are many wholesalers in the market and some do not pay up front. This is our advantage. We survive in this market by paying up front". Nonetheless, when paying suppliers up front and shipping consignments straight to its clients, as it is the case

with *Recicle a Vida*, *Brasil Limpo* reserves the right to apply discounts on future purchases should the weight of the load at the delivery point be lower than that communicated by suppliers. Bottles usually lose moisture along the way, as remaining contents evaporate through exposure to the sun and wind. Hence, *Brasil Limpo* asks its clients to weigh consignments upon delivery so that it can calculate the amount due to its suppliers and eventually discount any differences on future transactions. The fact that *Brasil Limpo* applies such discounts unilaterally is telling of where the power lies in the relationship.

Brasil Limpo buys plastics both sorted and unsorted, baled and loose, as a strategy to reach out to more suppliers – from the least endowed to the best equipped – and, hence, gain access to more material, especially PET, since it has the highest market value among the plastic resins. Most players at the initial nodes of the recycling network are not as lucky as *Recicle a Vida* in having their own shed to sort plastics according to resin type; hence, by buying materials unsorted, *Brasil Limpo* can trade with a wider pool of suppliers. In fact, whenever suppliers are located near one of *Brasil Limpo*'s or its partners' warehouses, Ivan prefers to buy plastics unsorted and loose in super sacks as a strategy to maximise profit. The cost he incurs buying super sacks of unsorted plastics and paying workers to sort and bale them by type is lower than the price of bales of the cheapest plastic resin among the three that *Brasil Limpo* deals with, i.e. PP. If suppliers are not located nearby, though, transportation costs can invalidate the savings generated by in-house sorting. In any case, as a rule, *Brasil Limpo* only buys PP and HDPE sorted if suppliers impose this as a condition to sell their stock of PET: "Some cooperatives prefer to sell all their

plastics to a single buyer. So, we use PP and HDPE as bait to have access to more PET", declared Ivan.

When buying PET bottles sorted by colour, *Brasil Limpo* gives preference to clear bottles, as they are easier to sell and also have a higher market value. Nonetheless, it has become praxis among collectives of waste pickers only to sell clear PET bottles if buyers also agree to take some green and blue bottles, as well as some bottles of cooking oil in their load, a sort of tie-in sale strategy to avoid being left with materials they would struggle to sell once the most sought after materials had been traded. According to Ivan, "there is somewhat of a consensus that consignments of PET should follow a 70% clear and 30% other types of PET bottles rule". In any case, however, *Brasil Limpo* does not buy sorted PET bottles coming in colours other than green or blue, nor does it buy bales of PET bottles of assorted colours. In fact, like *Recicle a Vida*, *Brasil Limpo* is also struggling with *PET lixo* and cannot find a market for it, although Ivan was not familiar with the nomenclature, which seems to be a neologism invented by members of *Recicle a Vida*. Between 2014 and 2016, *Brasil Limpo* accumulated 300 tonnes of *PET lixo*. However, unlike *Recicle a Vida*, *Brasil Limpo* has access to space to store its stock of *PET lixo*. Fearing that if disposed of at *Lixão da Estrutural* these bottles would once again be reclaimed by waste pickers, eventually returning to *Brasil Limpo* through its supply chain, causing him to lose money twice, Ivan decided to keep them as a strategy to minimize the disturbance caused by these market-less bottles. He was not sure, however, why recycling companies were not acquiring PET bottles in colours other than green or blue or which were opaque; this mystery was only elucidated once I visited a recycling company (see Chapter 10).

Brasil Limpo operates in 13 states, either directly or through partner organisations. Some of its warehouses are equipped with high power presses which are able to produce bales of PET bottles that are considerably denser and heavier than the ones produced by its suppliers. Thus, when buying plastics unsorted, *Brasil Limpo* can better control their materiality, especially as concerns the bulkiness of plastic packaging and its impact on shipping costs. While the bales of PET bottles produced by *Brasil Limpo* weigh 330kg on average, those produced by *Recicle a Vida*, for instance, weigh between 140-180kg. On top of that, in some of its warehouses, *Brasil Limpo* has a bottle perforating machine which costs around R$ 8,000.00 (USD 2,100) and, according to Ivan, "is worth every penny". Once perforated, PET bottles are more easily pressed, resulting in yet denser and heavier bales. If the bottles are perforated, bales can weigh up to 450kg, more than double the average weight of bales produced by *Recicle a Vida*, which implies a 25% reduction in transport costs, from R$ 0.27 to R$ 0.20 per kg, as estimated by Ivan.

Brasil Limpo's territorial embeddedness, understood in terms of its somewhat spatially decentralised operational structure, as well as its infrastructural capacities, most importantly the powerful machinery it owns, puts the wholesaler in a privileged position to confront both the materiality of PET bottles and the spatio-temporality of the recycling economy. By positioning itself geographically closer to its suppliers across the country and producing heavy bales in its warehouses, *Brasil Limpo* is able to make a more efficient use of the carrying capacity of freight vehicles, transporting more material per load, therefore reducing the turnover time of capital and the burden of shipping on its operational costs, which is the main cost incurred in recycling PET, due to the spatial concentration of recycling companies in

the territory, as shall be discussed in subsection 9.2. Consequently, the wholesaler enjoys higher profit margins and also has more room for manoeuvre in negotiating prices with its clients, making it harder for smaller and less well-off players, such as cooperatives of waste pickers, to compete in the market. By decentralising its operations and, hence, reducing shipping costs per unit, *Brasil Limpo* is further able to expand the geographical frontier of its business through a capillary network of suppliers, making it economically feasible to ship plastic packaging from further away to spatially concentrated recycling companies, therefore consolidating its already advantageous and dominant market position as supplier of post-consumer plastics.

Further to territorial embeddedness, the wholesaler articulated a deep network embeddedness, referring to the "'degree of connectivity within a GPN, the stability of its agents' relations and the importance of the network for the participants" (Henderson et al. 2002:452). According to Ivan, out of the six companies which dominated the PET recycling market – i.e. *Ecofabril*, *M&G Fibras*, *Unnafibras*, *Ober*, *Resilider* and *CPR* – *Brasil Limpo* maintained business with five. The wholesaler used to supply materials to all of them, though *CPR*, which according to Ivan is the biggest player in the market, managed to secure direct suppliers in the northeast of Brazil and ceased trading with them. Back in 2016, when I interviewed Ivan, *Ecofabril* was by far *Brasil Limpo*'s largest trading partner; the wholesaler supplied close to 70% of all the PET collected by the recycling company. The temporality with which *Brasil Limpo* negotiated price and volume with recycling companies also placed the wholesaler in a strategic position in the market. In order to mitigate the effects of price volatility on its business, a major issue in the PET

recycling market, *Brasil Limpo* negotiated price and volume with recycling companies on a monthly basis. This procedure allowed the wholesaler to plan its purchases in advance, knowing beforehand how much of it would be sold, therefore reducing the risks intrinsic to the business, and also to benefit from price falls, stocking materials whenever these occur. Consignments, however, would not be delivered at once, but split in loads throughout the month, and payment would habitually be received around four days after delivery. Due to the temporal mismatch between the payment policy of *Brasil Limpo*'s clients, i.e. deferred payment, and that practiced by the wholesaler towards its suppliers, i.e. upfront payment, and given the geographical scale of *Brasil Limpo*'s business, which connects waste pickers in the mid-west and northeast with recycling companies in the southeast, meaning that consignments can spend up to three days in transit, the wholesaler must have access to a reasonable amount of working capital to remain financially stable.

Ivan claims that recycling companies also benefit from negotiating price and volume in advance, comparing the PET recycling market to the agroindustry: "just like big companies operating in the food industry must guarantee their supply either through binding agreements with farmers or by investing in verticalisation to produce their own inputs, so too must recycling companies make arrangements to secure their supply". He questioned, however, whether recycling companies rely excessively on suppliers, which, according to him, "is a great mistake. There is no loyalty in the market, hence recycling companies' dependency on wholesalers leaves them vulnerable". To prove his point, Ivan claims that PET recycling companies periodically have secret meetings to discuss the rules of the market, including price, as a strategy to mitigate such vulnerability. According to him, though, despite the

fact that they are secret, he is always one of the first to know when these meetings are held. In an attempt to earn *Brasil Limpo*'s loyalty and invoke reciprocity, given the wholesaler's supply capacity, recycling companies with whom it has business disclose confidential information about the meeting to Ivan. He argues that, unlike other players in the market, *Brasil Limpo* is "loyal like a dog" to its clients, in his own words, and maintains long-lasting relationships with them.

Interestingly, Ivan defined *Brasil Limpo*'s relationship with its clients along similar lines as his description of the company's engagement with suppliers. If in referring to the latter he was rather oblique, saying that suppliers are "tied to the company through agreements, loans, cash advances and favours", when contemplating the former he openly mentioned "dependency" as a trait of the relationship between *Brasil Limpo* and its clients. Through its business practices to confront the materiality of PET and deal with the spatiality and temporality of the recycling economy, *Brasil Limpo*, at least as perceived by Ivan, seems to have managed to secure its market position, creating dependency ties with both its suppliers and clients, but more pronouncedly with the former given its advantageous power asymmetric position vis-à-vis them, and, therefore, giving rise to a governance structure that contains elements of the captive type, as described in the Global Value Chain literature (see Gereffi et al. 2005). While *Brasil Limpo*'s suppliers depend on the company due to the combination of their habitual capital-deprived situation and spatio-temporal constraints arising from the organisation of the PET recycling economy, clients depend on the wholesaler due to its high supply capacity, which is a function of its strategic position from a spatial, temporal and material standpoint. Although it could be argued that *Brasil Limpo* is also dependent on its suppliers and

clients, its vulnerability vis-à-vis each of them is drastically different. On the one hand, in its relationship with its clients both parties seem to be equally vulnerable to one another, since just as its clients depend on *Brasil Limpo*'s high supply capacity, the scale at which the wholesaler operates means that there are only a few buyers with whom it can trade. On the other hand, in its relationship with waste pickers, these are visibly in a more vulnerable position, not least because there are thousands of them around the country, often competing rather than collaborating with one another. This means that while they are easily replaceable, this is not often the case with *Brasil Limpo*, which can be one of the few trading options, depending on where the supplier is located.

9.2. "The market demands more material than it is able to supply": Mobile products, immobile wastes

In a guest editorial for a themed issue on materiality and waste, Gregson and Crang (2010) claim that waste is not a self-evident category, fixed in advance, but a social construction, historically mutable and geographically contingent. Hence, what is considered waste in one particular spatio-temporal context might not be treated as such in another. Gille uses the concept of waste regime to explore this social malleability of waste. According to her, "while some waste can be turned into value in practice, (…) some materials will be routinely left unrealized – either as use or as exchange value", as a consequence of "a specific set of social institutions that determine (…) what wastes, and not just what resources, are considered valuable by society" (2010:1054–56). The concept of waste regimes sheds light on these social processes, in an attempt to understand how waste is produced, circulated and

transformed. In this section, I problematize the spatio-temporal organisation of the PET recycling economy in Brazil and criticise the resource/waste regimes to which it gives rise. I attend to the dynamic processes that iteratively include and exclude subjects and places from the recycling network in order to more fully grasp the uneven geographies that condition their possibility and their potential for promoting waste pickers' empowerment (Bair and Werner 2011). My point of departure is a challenge faced by *Brasil Limpo* in its experience entering a new market segment, i.e. PET flake production, concerning the availability of post-consumer PET bottles for recycling, and my observations in a Whatsapp™ group for wholesalers and recyclers of PET.

Ivan is not only in the wholesaling business; he also produces flakes and pellets of HDPE and PP in his plants in Braslândia, Anápolis and Natal – the first two located in the mid-west, and the latter in the northeast of Brazil. Flakes are fragments that result from chipping plastic, while pellets are one step further in the recycling process and refer to the product resulting from melting flakes, extruding the material through a die and cutting it into granules. According to Ivan, it is not wise for *Brasil Limpo* to invest in the production of PET flakes or pellets because, in his own words, "the investment required is too high, the process of recycling PET too complex, and the PET recycling market too concentrated". When compared with other plastic resins, PET has much stronger barrier properties; i.e. it has a higher capacity to prevent leakage of contents and contamination from external fluids and gases. Hence, one of the main applications of PET is in packaging for food and beverages. In fact, a report published by the Brazilian Association of the PET Industry (ABIPET), providing an overview of the sector in 2013, indicates that

around 90% of the annual volume of virgin PET resin consumed in Brazil has been consistently employed in packaging production since the early 2000s (ABIPET 2013). With developments in recycling technologies, post-consumer recycled PET pellets, or simply PCR-PET, can now be produced to such a grade of purity that they are suitable for application in direct contact with foodstuffs. Although bottle-to-bottle recycling accounted for around one quarter of the PCR-PET application in 2013, market players expect this segment to grow the most (ABIPET 2016). The process of producing food-grade pellets, however, is costlier and more complex than that of producing regular flakes and pellets, due to stricter quality requirements, hence Ivan's reluctance to invest in PET recycling and preference for processing other plastic resins which are not used in direct contact with foodstuff.

Notwithstanding, confirming claims made by Thaísa from *Recicle a Vida* of an alleged partnership between *Brasil Limpo* and *RD*, Ivan told me that Celso, owner of *RD*, whom he identified as his partner in other ventures, had leased the plant of *Itoplas*, a PET flake producing company based in Itobi, in the state of São Paulo. No wonder then that *Brasil Limpo* and *RD* had suddenly changed their policy and started providing *Recicle a Vida* with the invoice when consignments were destined for *Itoplas*; they controlled it, and therefore there was no harm in *Recicle a Vida* knowing the name of the company where the load was heading. I have, however, been informed that in 2018 *Itoplas* was acquired by another company. Despite Ivan's reluctance to invest in PET recycling, based on his belief that "the price difference between the kilogram of baled PET and PET flakes does not pay off the investment, because we are not able to produce it in large scale" (see Table 3 for information on prices), the corporate group of which *Brasil Limpo* was part had then started

producing PET flakes in a plant in Itobi. The flake they produced, though, was not suitable for application in direct contact with foodstuffs, instead being used to produce polyester fibre for the textile industry.

Table 3

Prices as Informed by Brasil Limpo - November 2016

	Price (per kg)	
Condition	Purchasing	Selling
Plastics - unsorted and loose	R$ 0.85-0.90	-
Clear PET - baled	R$ 1.90	R$ 2.20
Clear PET - flake	-	R$ 3.05
Green/Blue PET - baled	R$ 1.60	R$ 1.85
Green PET - flake	-	R$ 2.90
Blue PET - flake	-	R$ 2.65

Note. Prices informed by *Brasil Limpo.*

As of November 2016, they were producing 400 tonnes of PET flakes per month, although the plant had capacity to produce double that amount. Valéria, procurement officer at *Brasil Limpo* and manager of the Itobi plant, claims that this underproduction stems from the struggle to find enough material to buy: “We could be operating at full capacity, but we are currently working in only one shift, because the market demands more material than it is able to supply”. The material shortage Valéria referred to could be partially explained by the fact that it was winter when I interviewed her, and people consume less fizzy drinks during that season compared to summer. Further research advances, however, showed that the shortage was to some extent artificial, economically engineered through space-time in the service of the logic of capital accumulation, as I intend to demonstrate.

A couple of days after I interviewed Valéria, I was added to a Whatsapp™ group created by traders in the PET recycling market – the same one to which I referred in Chapter 5 – of which Valéria is also a member. I have remained a member of the group ever since, following discussions as an observer without intervening. Not long after I was added, and therefore around the same time that Valéria complained about the scarcity of materials, a seller based in the north of Brazil was advertising batches of leftover industrial PET generated by a bottle blowing and filling company based in Manaus, a city located in the heart of the Amazon Forest, 3,800 km away from Itobi. Recycling companies avidly seek leftover industrial PET for its quality, which is considerably superior to post-consumer PET, due to its higher purity. Nonetheless, no one expressed interest in his offer. One of the group members replied, saying that "the logistics of shipping materials from Manaus makes many buyers give up due to the high costs incurred", to which another added that "the time it takes to transport materials is also an issue. It takes 15 days… 15 days that you are left decapitalised waiting for the consignment, not to mention the cost of freight insurance".

At the heart of their considerations is the spatial concentration of recycling companies in the south and southeast of Brazil, which has the effect of increasing the capital turnover time for suppliers based far away: "More distant markets tie capital up in the circulation process for longer time periods and therefore have the effect of reducing the realization of surplus value for a particular capital" (Harvey 1975:12). Although I could not gather complete information about the market, due in most part to the unavailability of data and inaccessibility of potential informants, the data I was able to collect was consistent and strong enough to support my argument concerning

the spatio-temporal organisation of the PET recycling economy. To make my case, I shall first provide a panorama of the final uses of post-consumer recycled PET. According to the last census of the PET recycling industry in Brazil, commissioned by the Brazilian Association of the PET Industry (ABIPET 2016), just over a quarter of the post-consumer PET recycled in Brazil becomes either unsaturated or alkyd resins (28.6%): the first deployed in the automotive, construction, sanitation, electrical and naval sectors; the latter commonly used in the production of paints and coatings. The packaging industry, both for food and non-food items, and the textile industry consume another quarter each (25.7%). Laminates and sheets (8.6%), strapping (5.7%) and other uses (5.7%) account for the remaining consumption of post-consumer recycled PET (see Figure 26).

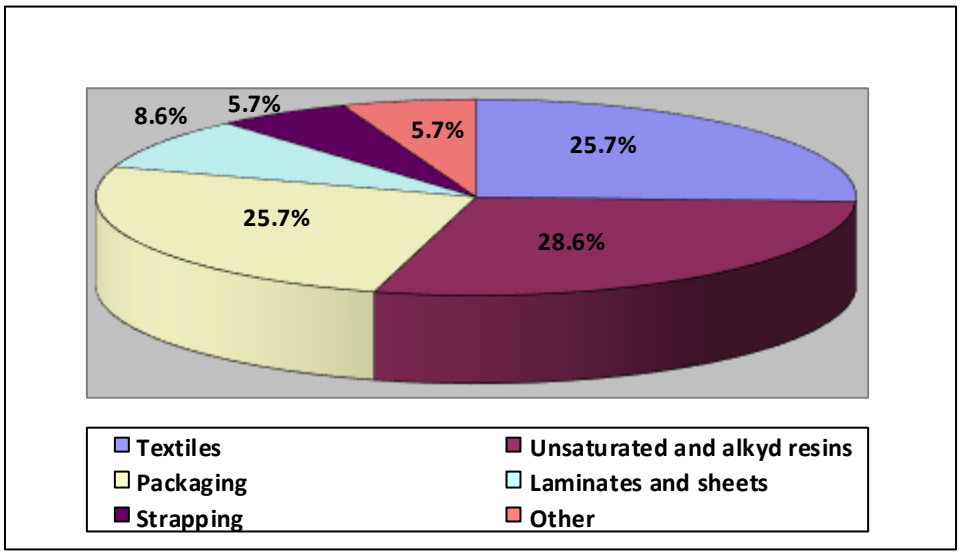


Figure 26. Final uses of post-consumer recycled PET – Brazil, 2016. Adapted from *10o Censo da Reciclagem do PET no Brasil*, by ABIPET – Associação Brasileira da Indústria do PET, 2016, São Paulo: ABIPET.

Even though I was not able to obtain information about the processing capacity of unsaturated and alkyd resin producers – the sectoral organization

representing them did not have this data and the companies I contacted did not want to take part in the research – I managed to find out the recycling capacity of the ten biggest recyclers producing PCR-PET pellets and recycled polyester fibre to serve the packaging and the textile industries (see Table 4). Their combined recycling capacity totals 208,000 tonnes/year of post-consumer PET. Considering that inactivity levels among recycling companies averaged 55% in 2015 (ABREPET 2014) it is estimated that they actually recycled around 100,000 tonnes of PET. If we take into consideration that Brazil recycled 274,000 tonnes of PET in 2015 – 51% of its consumption – just over half of which was deployed in the packaging and textile industries (ABIPET 2016), it follows that the ten biggest PET recycling companies in Brazil are responsible for processing 70% of the post-consumer recycled PET consumed by these two sectors. All but one of these companies – the exception being *Frompet* – are based in the southeast. Given that this industry in general is concentrated in the southeast and south of the country, as evinced by Figure 25 on Chapter 7.3, showing the spatial distribution of extractive and manufacturing industries in Brazil and presented in the discussion concerning return freight, it is safe to assume that producers of unsaturated and alkyd resins are equally concentrated in these regions, and consequently that most of the country's recycling capacity is condensed there.

Table 4

Recycling Capacity of the 10 Biggest Recyclers Serving the Packaging and Textile Industries - Brazil 2018

Company name	Nominal recycling capacity (tonnes/year)
CNP/Viscotech	36,600
Ecofabril	36,000
CPR	30,000
Clodam/TEPX	21,600
GlobalPET S.A.	18,000
Ober	18,000
M&G Fibras (now 3Rios)	17,000
Globalpack	12,000
AG Resinas	10,200
Frompet (owned by CPR)	9,000
Total	**208,400**

Note. Data retrieved from an unpublished report by ABIPET (2019).

Domestic production networks are therefore engineered in such a way that a considerable share of the goods consumed across Brazil is produced in the southeast and south and then shipped to other parts of the country. These products are then consumed and, once disposed of, their packaging returns to the southeast and south again to be recycled; all thanks to transportation technologies that have transformed local and unique markets selling seasonal products into commodities of an increasingly expansive market (Cresswell 2006). Nonetheless, not all packaging makes this return journey to be recycled. If, from a production standpoint, shipping products all over the country is economically viable, from a recycling perspective it often is not, despite the fact that recyclables are ordinarily shipped in the counterflow of distribution networks, and that shipping recyclables is consequently usually cheaper than shipping consumer goods. This is a clear indication that the logic of economies of scale, understood as having supposed gains in efficiency caused by an

increased scale of operation and usually invoked to justify the concentration of production around big conglomerates and in specific places, has an inherent flaw: gains for whom and efficiency concerning what? From the perspective of the trader based in the north of Brazil, mentioned above, who was struggling to sell a consignment of PET, it certainly does not qualify as such.

The logic of economies of scale prospers because producers work under a linear economic rationale and account for the materiality of PET packaging only until the point where it is placed in the market for consumption, opportunistically neglecting that "[i]n the Anthropocene, the 'afterlives' of industrially produced objects are the longest part of their lives" (Liboiron 2016:103). Under this linear economy framework, the shadow reality of plastic bottles as waste is supressed through the work of marketing, transforming bottles which have exhausted their market utility and have been discarded into mere externalities in the economic sense and, as such, separate from market realities and outside the spectrum of market calculations (Hawkins, Potter, and Race 2015), which is precisely what we observe in the Brazilian PET recycling market.

Even in circumstances when shipping packaging for recycling from distant areas is economically viable, there are reasons to remain critical of the rationale of the system, and therefore inquire into the politics behind said economies of scale. When I interviewed Ivan in 2016, for instance, the farthest away state in which *Brasil Limpo* operated was Rio Grande do Norte, from where the wholesaler shipped over 50 tonnes of PET bottles to São Paulo every week, distributed across three lorries. This journey is approximately 3,000km long and costs R$ 3,500 (USD 921) per lorry. This may not be as far as the journey made by PET bottles consumed in

some European countries, which until not so long ago traversed 18,000 kilometres by sea in order to be recycled in China, before China imposed an import ban on plastic waste (Tamma 2018), but nonetheless I was struck by how far PET bottles travelled in order to be recycled, a fact which invites closer scrutiny due to its implications regarding the power structure of the recycling network.

Although it may have become second nature, given the level of interconnectedness we as a globalized society have achieved, it is important to critically reflect upon the logic behind shipping post-consumer PET bottles over such a long distance – nearly 5 times the distance between Edinburgh and London. Post-consumer PET bottles are not a scarce resource available only in certain regions, like metal ores or rare-earth metals, for instance; quite the opposite, in fact. Likewise, PET recycling plants, understood as companies which are able to transform PET into an intermediate or end product through chemical processes, do not require any particular environmental conditions in order to operate. This means that PET recycling plants could potentially be installed nearly anywhere in the Brazilian territory; only energy and labour must be available. Still, they are concentrated in the south and southeast of the country.

It would be naïve to assume that this concentration is a by-product of a supposedly *a-spatial* capitalist mode of production, especially when empirical evidence demonstrates that the production of geographical landscapes is a central element of the system dynamics of capital accumulation (Castree 2009). For waste pickers based outside these regions, for instance, this spatial concentration more often than not implies having to rely on intermediaries to trade recyclables and consequently selling them for a price below market value to compensate for

brokerage fees and shipping costs. Reports published by a market research institute specialising in the chemical industry, for instance, indicate that a kilogram of PET is on average 30% cheaper in the north and northeast, when compared to prices offered in the south and southeast (Maxiquim 2016).

The economic system's reliance on transportation technologies, therefore, not only "opens up to a future that we cannot fully appreciate", for example in terms of the consequences of climate change aggravated by greenhouse gas emissions from burning fossil fuels, but also "brings about new assemblages and generates new spatial relations that at once contribute to this charge of indeterminacy and shape what is actualized at any given moment" (Braun and Whatmore 2010:xxii). Hence, the potential of recyclables to be transformed into resources again is mediated by spatio-temporal relations which, in their turn, "are deeply implicated in 'fixing' – or fulfilling – capitalist accumulation strategies inasmuch as they are fundamental to processes of securing market power, configuring economic scarcity and ultimately realizing value" (Christophers 2014:756). Thus, the spatial concentration of production and recycling capacity is imbued with an unavoidable politics of scale (Heynen and Swyngedouw 2003) as well as of a "politics of waste" that serves the interests of only a few who "regulate the production and distribution of waste in empirically tangible ways" (Gille 2010:1056), with direct consequences for the environment and for participants of the recycling economy, disproportionately affecting the least well-off.

10. *M&G FIBRAS*: FIGHTING THE MARKET WITH FIBRE AND PELLETS

Obtaining access to one of the recycling companies with whom *Brasil Limpo* does business was extremely challenging. I did not want to rely on *Brasil Limpo*'s connections to negotiate access – just as I did not count on *Recicle a Vida* to secure access to *Brasil Limpo* – for fear that it could have a bearing on my research, with participants filtering what they were willing to share, more than they would already do under normal circumstances. Based on what Ivan had told me, the relationship between *Brasil Limpo* and recycling companies seemed to be driven as much by trust as it was by suspicion. Hence, I thought it better to contact them by my own means, in order to avoid any possible association with the wholesaler.

First, I attempted to contact *Ecofabril* by phone. I was transferred to numerous departments, with each arguing that they were not capable of dealing with my request. Eventually, I was given the email address of someone who was supposedly responsible for authorising research visits to *Ecofabril*'s industrial plant. It was all too familiar. In any case, I sent an email. After a week I got a reply giving an excuse for not being able to attend to my request: "At the moment the company is undergoing an internal restructuration and is not open for external visits. Please contact us at another time". I asked how long the restructuration process was supposed to last and, as expected, got an evasive response saying that they had no estimate.

Worried that the same would happen with the other recycling companies with whom *Brasil Limpo* did business, I decided to contact them all, instead of

waiting to receive a definite response from one before contacting the others. Luckily, all of them had an online presence and contact details were available from their websites. Once again, in nearly all my attempts, my calls were transferred to a number of different departments, before being dismissed in one way or another. This difficulty obtaining access to research participants made me question to what extent the scope of existing research on waste pickers' empowerment, both on a theoretical and geographical level, might have been shaped not merely by researchers' preferences, but equally, and perhaps greatly, by hurdles posed by players in the recycling economy. Three of the calls I made to *Resilider* were mysteriously cut off when I finally managed to speak to the person who was supposedly in charge of authorising external visits. On my fourth attempt, he made it clear that there was no problem with the phone line, and hung up on me. I was not surprised. *Resilider* used to do business with *Whargo* and was also being investigated under *Operação Flake*, and therefore was probably not interested in partaking in research. At *Ober* and *Unnafibras* they were a lot friendlier, and provided me with an email address asking me to send a message with a brief explanation of my research and the purpose of my visit. It all seemed reasonable, but also turned out to be a dead end. *Ober* sent me an excuse saying that unfortunately they did not want to take part in the research without providing any further explanation, and *Unnafibras*, which declared bankruptcy in 2017, never replied despite my follow-up emails. *M&G Fibras*, however, did not follow the standard format.

The first person I spoke with on the phone at *M&G Fibras* was Alexandre Rocha, a commercial analyst with over 30 years of experience in the PET recycling market. He had a lot to share and, luckily for me, was legitimately interested in my

research. We talked extensively over the phone as he answered some of the queries I had about the PET recycling market and provided me with the coordinates to navigate *M&G Fibras*' internal bureaucracy in order to be granted permission to visit its plant and interview some of its employees. I received a prompt response to my request, and as soon as I provided the explanations required by the plant manager regarding my research, my visit was authorised. I was introduced by email to Luciano Gileno, operations manager at *M&G Fibras*, who was responsible for guiding me on the date of my visit. At Alexandre's suggestion, I requested permission to also talk to him and Antônio Freitas, senior procurement officer, which was granted by the plant manager. I spent a day at *M&G Fibras* touring the plant and obtaining detailed information about the PET recycling process and market.

At this point I should clarify that, although I intended to closely follow PET bottles all the way from being reclaimed at *Lixão da Estrutural* until their transformation into another product ready to re-enter the consumer market, I decided not to join the lorry transporting them from *Recicle a Vida* to *M&G Fibras*. The journey is 900 kilometres long and I did not consider it safe for me to spend hours on end locked with a stranger in a lorry cabin as he drove through roads I had never visited. Instead, I decided to reconvene with the PET bottles at their destination, not least because there was probably very little that I could learn by travelling alongside them. I could obtain the most crucial information regarding transportation from drivers before departure from *Recicle a Vida* or upon arrival at *M&G Fibras*, as I did.

This chapter is divided in two subsections. Having the recycling process as background, the first subsection examines *M&G Fibras*' governance strategies for dealing with the materiality of PET bottles, contaminants, pigments and labels and to

isolate itself from the risks deriving from its positionality vis-à-vis suppliers, as well as problematizing the effects that such strategies have on the recycling economy. Following this, I discuss some of the social practices that structure the PET recycling economy, and critically appraise *M&G Fibras*' discursive framing when contesting them, aiming to demonstrate that rather than fighting these practices, the company is actually reinforcing them.

10.1. "They can make better use of their time sorting": An industry's perspective on tackling materiality and the burden of space-time

The *M&G Fibras* plant in Poços de Caldas was built in 1977 by the Celanese Corporation, a multinational chemical company, to produce virgin PET pellets and virgin polyester fibre, therefore serving both the packaging and textile industries. It started producing recycled polyester fibre only in 1994, at which point ownership over the plant had been transferred to *Rhodia*. At that time, the plant had the capacity to produce 16,000 tonnes/month of virgin PET pellets and 2,500 tonnes/month of polyester fibre, of which a fifth was recycled. Then, it was reliant on other companies for the provision of PET flakes to be used as input in the production process of recycled polyester fibre. Throughout the years control over the plant was transferred to other corporations, until it was bought by *M&G Fibras*, a company owned by the multinational *M&G Chemicals*, self-acclaimed as "one of the world's largest producers of PET for packaging applications and a technological leader in the polyester market" (M&G Chemicals 2019), in 2002. In 2007, *M&G Chemicals* underwent an operational restructuring of its activities in Brazil and concentrated production of virgin PET pellets in another of its plants, strategically situated at

Porto Suape, a major seaport located in the state of Pernambuco, in the northeast of Brazil. The raw materials needed in the process of producing virgin PET, i.e. monoethylene glycol and terephthalic acid, are often imported, therefore *M&G Chemical*'s plant in Porto Suape had a comparative advantage over the landlocked plant in Poços de Caldas. The latter continued producing only virgin and recycled polyester fibre.

Willing to make better use of the assets that became idle after restructuring its activities in Brazil in 2013, *M&G Chemicals* decided to diversify its business in Poços de Caldas, repurposing part of its plant to focus on another segment of the PET recycling economy that, unlike the market for recycled polyester fibre, was growing consistently: packaging. The company invested R$30MM (USD 7.9MM) in an imported PET bottle crushing and pelletizing line to produce super-washed flakes to be used as an intermediate product in its own production of food-grade post-consumer recycled (PCR) PET pellets, i.e. that are of sufficient quality to be used by the packaging industry in direct contact with foodstuffs. The line has capacity to produce 1,200 tonnes/month of PET flakes, 800 tonnes/month of PCR-PET pellets, and 500 tonnes/month of recycled polyester fibre.

According to Luciano Gileno, the decision to shift gears towards the packaging industry, by producing PCR-PET pellets, was based on a market analysis of the textile sector in Brazil: "Domestic textile industries are succumbing to competition from China. If we did not diversify our product portfolio, we would succumb with them", declared Luciano. The closure of *Unnafibras*, one of the biggest producers of recycled polyester fibre in Brazil, in 2017 confirms Luciano's point. Capitalising on its reputation in the virgin PET market, *M&G Chemicals*

expanded its operations in the recycling market, producing its own inputs to reduce costs and have better control over quality, hoping to take advantage of its know-how and build its image as an environmentally friendly company. This strategy, however, did not succeed, and the company ended its activities in Poços de Caldas in January 2018, after the conclusion of my fieldwork, later selling its industrial park to *3Rios* in 2019. This section looks back at *M&G Fibras*' processes and reflects on the consequences of the techniques and governance mechanisms it used to deal with the materiality of PET bottles, contaminants, pigments and labels and to mitigate the risks accruing from its spatio-temporal positionality in the PET recycling network.

M&G Fibras' plant in Poços de Caldas operated 24 hours a day across 4 shifts when I visited it. There were 13 people working on the recycling line in each shift; they made up a fifth of the plant's employees. The recycling line occupies two big sheds and comprises a number of processes, most of which are intended to eliminate contaminants. Bottles are processed one colour at a time in order to predict and control the colour of products, aiming to achieve homogeneity. Luciano explains that it is not economically viable to remove pigments from bottles during recycling, despite being technologically possible, though not with the machinery owned by *M&G Fibras*. The company, however, does not buy PET bottles coming in colours other than clear, green and blue. Elucidating a mystery that no other research participant had been able to clarify, Luciano explains that pigments added to bottles are made from different substances and, when mixed, these can compromise the quality of recycled PET. To control and mitigate the disruption caused by the interaction between these materialities, *M&G Fibras* only buys bottles to which no pigments have been added – i.e. clear bottles – or have been dyed in colours

abundantly available in the market, i.e. green and blue. Hence, contrary to what I had imagined, the problem is not that certain pigments are toxic or render recycling impossible, but rather that the new colours of PET packaging introduced to the market expose the recycling economy to a new category of risks arising from the interactions between different pigments, which was not so much an issue when the market was trichromatic.

Furthermore, when procuring PET bottles, it is *M&G Fibras*' policy to only buy colour-sorted bales. "Carnivalesque bales", as Antônio Freitas refers to bales of assorted coloured PET bottles, are of no interest to the company. It is not hard to understand why, given *M&G Fibras*' profit-maximising interests as a listed company. Not only may carnivalesque bales contain bottles dyed in colours other than those *M&G Fibras* accepts; buying them would also imply having to hire employees to colour-sort bottles before feeding them to the recycling line, since the available technology is not able to carry out such task on a large scale. In face of heterogeneity and the costs and difficulties it adds to the recycling process, recyclers response is either to dispose of materials altogether or to seek out disadvantaged labour to carry out the task cost effectively (MacBride 2013:174). *M&G Fibras* gives precedence to the latter. This expedient, which clearly includes a cost saving rationale, since relying on waste pickers to colour-sort PET bottles is undoubtedly a more financially appealing alternative than hiring employees, leads us full circle back to the issue of adverse incorporation.

As Phillips and Sakamoto note, "the generation of competition within GPNs is associated with forms of exploitation that perpetuate extreme levels of precarity and vulnerability for the labour force, and feed into a reinforcement, rather than

alleviation, of chronic poverty" (2012:308). Hence, *M&G Fibras*' profits – and those of other major recycling companies, as a matter of fact – emerge at least in part from savings on National Insurance payments, since these are not paid to waste pickers, as unregulated workers. Elizalde et al. (2012) come to the same conclusion in their study of waste pickers in Montevideo, Uruguay, and claim that although much of the value created through recycling is dependent on the efforts of waste pickers, it is recycling companies who appropriate the biggest share of it, which exposes the exploitative relations upon which the recycling economy is based. Colour-sorting, however, is only one facet of this process. As we have previously discussed (see subsection 7.2), due to further technological limitations, *M&G Fibras* enforces other restrictions concerning the types of PET bottles it buys, as will become clear from the following description of its recycling process.

Bales of colour-sorted PET bottles are opened and bottles fed into the recycling line through an automated conveyor system (Figure 27). Bottles go through a friction washer to remove dirt and other easily removable contaminants and, in sequence, are conveyed through a de-labeller and a magnet that extracts pieces of ferromagnetic metal that might be mixed in with the bottles (Figure 28). Following this, they are scanned at high speed by an optical sensor which is deployed as an accessory colour-sorting tool that uses compressed air to reject any material – mainly bottles and labels – dyed in colours other than those it has been programmed to allow. Before automatically moving on to the grinder, bottles are screened by two *M&G Fibras* employees who, standing beside the conveyor belt, manually remove any unwanted materials which the machinery has failed to identify. The bottles are then crushed and the flakes re-washed prior to moving on to a sink-float tank where

water is used as a mechanism to separate PET from other plastics used in caps and labels – commonly polypropylene (PP) and low-density polyethylene (LDPE) respectively – based on their differing densities. While PET has a higher density than water, and therefore sinks, PP and LDPE have lower densities and hence float.

Figure 27. Clear PET bottles lay outside one of *M&G Fibras*' sheds at its plant in Poços de Caldas, waiting to be fed into the recycling line. November 2016.

Figure 28. Pre-washed clear PET bottles in the conveyor belt at *M&G Fibras*' recycling line. November 2016.

These processes, however, are ineffective with PVC heat-shrink sleeve-labels, which are becoming ever more common in the market. Since PVC sleeve labels are attached to bottles using heat, which makes them shrink as they envelop the bottle, conforming to its shape, the friction washer and the automatic de-labelling machine cannot remove them. Furthermore, as Cleusimar had already informed me (see subsection 7.2), PVC and PET have similar densities; both therefore sink in the decantation tank, meaning that the former becomes a contaminant in the recycling stream. For this reason, *M&G Fibras* does not buy PET bottles wrapped in heat-shrink PVC sleeve labels, or *Birinight* as members of *Recicle a Vida* refer to them, and requires suppliers to refrain from mixing these into their bales. In this respect, it is interesting to note that "rather than capturing some processes, in resource recovery

power may be evinced more in the expulsion of certain materials; wastes may be costs to be externalised onto other actors and/or the environment" (Crang et al. 2013:15). Since power "is explicitly relational and asymmetrical: to have power is to have power *over* another or others" (Lukes 2005:73), *M&G Fibras*' position with regards to PET bottles with PVC heat-shrink sleeve-labels is yet another indication of the adverse incorporation of waste pickers into the PET recycling economy.

The governance mechanisms enforced by *M&G Fibras*, setting standards in an attempt to instill some modularity in the PET recycling network – to refer to the Global Value Chain governance terminology –, and therefore mitigate the uncertainty which is intrinsic to post-consumer or end-of-life markets when it comes to quality control, demonstrate how materiality is crucial to the process of value extraction and capture. These requirements and standards are but *M&G Fibras*' *response* to the 'thing-power' of coloured PET bottles and PVC sleeve-labels "as a material with the capacity, in certain settings and events, to *provoke* political actions" (Gabrys et al. 2013:8 emphasis in original). Purists putting forward a human-centric vision of agency would probably claim that instances such as this are but mere demonstrations of the limits imposed by things on human agency. Adopting a non-anthropomorphic understanding of agency as the capacity to act independently, and problematizing the interference of coloured PET bottles and PVC sleeve-labels in the recycling process from the perspective of things rather than from humans, I regard the constraints they impose to recycling as legitimate manifestations of their agency and *M&G Fibras*' standards as a political *reaction* to them.

Notwithstanding, materiality has so far received very little, if any, attention from the Global Production Network and other value chain-related scholarship,

which commonly adopts a firm-centred approach to governance (Crang et al. 2013:22). End-of-life goods, however, are not passive objects; their material characteristics has a bearing on the organization and governance of recycling and production networks, such that "a multiplicity [of possibilities] depends on the precise conjuncture of techniques and technologies, materials and materiality within any one project. Materials constitute both stubborn facts and economic possibilities in all this" (Gregson et al. 2013:20).

In the context under analysis, and from *M&G Fibras*' point of view, PET bottles with PVC heat-shrink sleeve-labels – and for that matter also PET bottles coming in colours other than clear, green and blue – are stubborn phenomena deprived of economic significance, since its machinery cannot deal with their materiality. Freitas even advises cooperatives not to waste their time de-labelling *Birinight* bottles, as *Recicle a Vida* does, arguing that "they can make better use of this scarce resource called time by sorting more materials". From the perspective of the company's governance to maximise value capture, these materials should be externalized and kept out of the recycling network as much as possible, hence the importance of setting quality requirements or standards. More than a matter of complexity of transactions, ability to codify transactions and capabilities in the supply-base – key determinants of value chain governance according to the model developed by Gereffi et al. (2005) –, material properties and characteristics seem to be *the* determinant factor ruling *M&G Fibras*' recycling network governance. The quality requirements discussed above, however, are not the only restrictions imposed by *M&G Fibras* in its effort to govern the recycling network. A further examination

of its processes reveal other layers of material-informed governance, as I shall demonstrate below.

Screw conveyors inside the heat-shrink tank collect PET flakes at the bottom of the tank and move them forward to another tank to be rinsed. Subsequently, the PET flakes are dried and sifted. Coarser flakes are separated for further refinement, while finer ones are packed in super sacks even bigger than the ones used for storing PET bottles at *Lixão da Estrutural*. The company maintains a stock of 300 tonnes of flake in its plant to feed its pelletizing and polyester fibre producing lines. The production process of recycled polyester fibre and PCR-PET pellets is similar, but requires different machinery. In simplified terms, PET flakes are heated and melted, and then compressed through a metallic plate with small holes in a process called extrusion, which produces tiny filaments which will become either polyester yarn or spaghetti-looking tubes that are subsequently chopped up to produce pellets once cooled. Since PCR-PET pellets are usually sold for use in packaging for foodstuffs, and given that by and large PET containers used in packaging for food are clear, *M&G Fibras* uses only clear PET flakes in the production of PCR-PET pellets. When producing recycled polyester fibre, on the other hand, *M&G Fibras* dilutes some coloured flakes among clear ones and then dyes the yarn either black or grey.

Given the wider application of clear flakes, *M&G Fibras*, like most of the big recycling companies, has a strong preference for clear bottles; more specifically, clear bottles of soft drinks, as opposed to clear bottles used in the storage of cooking oil, i.e. *PET óleo.* As explained previously (see Chapter 7.2), while soft drinks can be easily washed off, cooking oil is much harder to remove in the recycling process due

to the chemical affinity between plastics and oil. According to Luciano Gileno, the most effective way to clean oily PET bottles is mechanically, letting them drain with the aid of gravity, a time-consuming process incompatible with the pace of work at big recycling companies. Instead, *M&G Fibras* demands that suppliers sort *PET óleo* from clear bottles of soft drinks. In any case, the company cannot avoid this nuisance altogether. Confirming what Ivan from *Brasil Limpo* had anticipated, Freitas referred to the existence of a market practice to negotiate consignments with a 70% clear, 30% green, blue and *PET óleo* ratio, so as to cater for recycling companies' demand for clear bottles while also accommodating the concern of players at the initial nodes of the recycling network with the tradability of less sought-after types of PET bottles.

In order to enforce its governance policy, *M&G Fibras*, again like most of the big PET recycling companies in Brazil, adopts a deferred payment policy and only pays suppliers around a week after delivery. This procedure gives the company enough time to assess whether its quality requirements have been met, particularly in light of the high levels of distrust among market players, which brings to the fore concerns about risk. "If the supplier and buyer are perfectly reliable, there is no difference whether the buyer pays the supplier before the delivery or after. It is only a matter of accounting for the time value of money and discounting for future cash flows. With supply risk, however, it becomes important to decide who bears that risk" (Babich and Yang 2017:152). Supply risks in the PET recycling economy are mainly related to quality, and its roots are found in the intersection between the materiality of recyclables and the spatial configuration of the recycling network.

In 2016, *M&G Fibras* processed 60 tonnes of PET bottles per day – almost the equivalent of what *Recicle a Vida* processes in a month – of which between 20-

30% is lost in the recycling process, mostly due to the presence of contaminants that come mixed in with bottles. Contaminants which have market value, like paper, metals and other plastics, are sold on the recycling market, along with PET grout and powder, by-products generated in the production process of PET pellets and polyester fibre; but these account for only a minor percentage of losses. According to Freitas, employees working at the *M&G Fibras* recycling line have found such odd things as paving stones and old engines padding out bales of PET bottles, as well as bottles filled with broken glass, water and soil. For Freitas, the kind of contaminants they find mixed with bottles as well as the rate of contamination, which he deems to be high, "signals the lack of loyalty among players in the PET recycling market".

Furthermore, since recycling companies are concentrated in the south and southeast and their suppliers are often based in different corners of the country, sometimes hundreds of kilometres away, they often cannot assess the quality of the supply *ex ante*, i.e. before buying; from this difficulty emerges supply risk. The distance between suppliers and recycling companies also implies that the risks of transportation – e.g. goods damaged in transit and cargo theft or loss – are far from negligible. Given that positionality, or the relational positioning of two agents/entities in space-time, as Sheppard (2002) claims, not only conditions the possibilities of any given agent, but also involves power relations, the decision regarding who bears these risks is not taken on the basis of mutual agreement, and neither does it account for the players' ability to cope with risk; rather, it is imposed by a few players who are in a privileged spatio-temporal position. The deferred payment policy is but one such form of manifesting power.

If quality requirements are not met, particularly as concerns the rate of contaminants, which is usually deemed to be disproportionately high if over 30%, *M&G Fibras* grants itself the right to impose unilateral price discounts. Hence, by deferring payment, *M&G Fibras* and other big recycling companies are safeguarding themselves from the disruption caused by contaminants, forcing suppliers to deal with their materiality while also discouraging them from purposefully mixing alien materials in with bales, in an attempt to guarantee that the materials they procure will be of good quality. The policy further implies that suppliers are responsible for advancing freight costs as well as for bearing eventual losses that might occur during shipping, since payment is only made if materials are delivered and once they have been processed. Ultimately, deferred payment acts as an instrument of adverse incorporation; a shield mechanism engineered by recycling companies to mitigate the risks entailed by space-time and materiality through their large scale transfer to suppliers, whom in most if not all cases are in a less stable financial position to deal with such risks than recycling companies.

This policy only works because the recycling market, for PET as well as for other materials, is an oligopsony, i.e. is controlled by a few buyers with enough market power to determine the terms and conditions of purchase (Borges and Arantes 2013; Bosi 2008). This situation is challengeable not only from a fairness point of view, since it overburdens underprivileged nodes in the recycling network, being particularly harmful to those who do not engage in disloyal practices, but also because it fails by and large to address the root cause of the problem that triggered its formulation, i.e. the widespread feeling of distrust that permeates the recycling market. If, on the one hand, recycling companies have reasons to doubt the quality of

materials they procure, suppliers equally have grounds to question their buyers' solvency and inclination to keep their word, especially when there is a pronounced power asymmetry between the two. Unilaterally imposing punishment measures does little to cultivate a trusting market environment, and may actually even encourage defiant behaviour on the part of suppliers. This becomes especially problematic in light of *M&G Fibras*' desire to strengthen its ties with collectives of waste pickers, as shall be discussed in the next section.

10.2. "It is a nasty market": The impact of social practices on price

It comes as no surprise that *M&G Fibras*' main concern when choosing its suppliers is quality. For this reason, it privileges the acquisition of post-industrial PET traded by beverage companies, for instance, who sell damaged PET preforms, i.e. test tube-shaped flasks that are heated and blown to be transformed into bottles. Post-industrial PET comes with nearly no contaminants and is therefore of better quality than post-consumer PET. Nonetheless, "because the beverage industry is constantly improving its processes, reducing losses to a minimum, procuring post-industrial PET is getting harder and harder", according to Freitas. As a result, recycling companies are increasingly relying on post-consumer PET, which, however, is not exempt from challenges. This section examines some of the social practices prevailing in the PET recycling economy, and discusses their impact on the prices and competitiveness of the products manufactured by *M&G Fibras*. It further critically explores how *M&G Fibras*' own practices and discursive selectivities act to reproduce rather than to challenge unfavourable aspects of the structure of the recycling economy.

10. M&G Fibras

When I visited *M&G Fibras* in 2016 it was operating with excess capacity: 20% below capacity for recycled polyester fibre and 50% below for PCR-PET pellets. Luciano attributed this to a mixture of material shortages, price fluctuations, and a market preference for virgin PET products, especially in the pellet segment. Like other research participants, he argued that procuring PET bottles is trickier during winter compared to summer due to reduced consumption of soft drinks and bottled beverages. Reflecting on the systemic effects of such seasonal variation, Luciano explained that the price of PET bottles consequently soars during winter, affecting the price of PCR-PET pellets and recycled polyester fibre, which then lose competitiveness compared to their virgin substitutes, particularly with the ever-reduced prices offered by China. According to *Maxiquim*, a market research institute specialised in the chemical industry, the price ratio of PCR-PET pellets compared to virgin PET pellets peaks at around 85% during winter, while it reaches close to 70% during summer (Maxiquim 2016). If the price difference between virgin and recycled PET pellets and polyester fibre is too small, buyers tend to prefer the former, which corroborates the point made in Chapter 1 about the importance of exempting post-consumer recyclables and the products made from them from taxes, or at least reducing the relevant tax rate.

Although it was not entirely clear why market players who have access to storage space, such as *M&G Fibras* or *Brasil Limpo*, do not use it to mitigate the seasonal market cycle by releasing materials in a steadier flow, it did not seem as though PET bottles were available in excess during the summer to the point of being stocked for winter, based on Luciano's testimony. In fact, Antônio Freitas, procurement officer at *M&G Fibras*, claims that the availability of PET bottles has

been consistently declining since 2000. He attributes this to changing consumption habits motivated by growing concern with the health implications of consuming fizzy drinks, for instance, which seems fairly plausible. Further, according to him, “the packaging industry drive to constantly reduce the PET content of bottles, attaining a 21% weight reduction per unit between 2002 and 2012, as well as the financial crisis that hit Brazil in 2012 and is ongoing, also contributed to the decline of PET bottles in the recycling market”. Despite this decline, Brazil does not recycle all of the PET bottles it consumes. The country’s recycling rate for PET, which was 51% as of 2015 (ABIPET 2016), is comparable to that of European countries, which was 57% as of 2017 (Plastics Recyclers Europe 2018), but there is still a lot of room for improvement. However, my impression is that in order to reach the other 50%, which is not as easily accessible, structural changes must occur.

Waste management practices have to be reconsidered, especially as concerns household waste segregation and collection, and the PET recycling economy must be reorganised spatially, so that bottles consumed in places far away from the recycling companies concentrated in the south and southeast can be recycled. Though imperative, these changes are rather unlikely to occur, since they demand lifestyle changes, interfere with established power systems and challenge the persistence of spatial constructs, which in any case only reinforces the importance of discussing them. As Sheppard argues in his examination of the reciprocal effect of space-time on society, claiming that both are dialectically relational, “it is important to deconstruct this sense of inevitability and to realize that their persistence [of places and spaces] cannot be taken for granted but reflects a constant struggle to hold things together. At the same time, however, considerable persistence does exist, and the

materiality of places and spaces has real and concrete effects on future trajectories" (2002:319). Cohesive policies are needed from the national to the local level in order to break this path dependence cycle, which is created by the interrelation of space-time and society, or at least to remedy the inequalities arising from it, as well as to spur on the necessary lifestyle changes mentioned above.

Among suppliers of post-consumer PET bottles, *M&G Fibras* prefers to trade directly with collectives of waste pickers than with wholesalers. According to Freitas, "cooperatives and associations tend to be more loyal and more receptive to *M&G Fibras*' policies and guidelines", which ultimately result in higher control over quality. The company specifies, for instance, what is understood as a contaminant, as well as the types of materials that should be used for binding bales; cardboard, for example, is specifically forbidden, because if wet, it masks the true weight of bales. It was interesting to hear reference to the word 'loyalty' again used to allude to the kind of behaviour expected from waste pickers. As with *Brasil Limpo*, the extent to which *M&G Fibras* was willing to reciprocate its expectation of allegiance was unclear. The seemingly unidirectional nature of the expected commitment was, once more, revealing, and even more so was the connotation of obedience and subservience that 'loyalty' implied in this context. Policies and guidelines were not agreed between the parties, but rather flowed from *M&G Fibras* to suppliers. The company's capacity "to establish and maintain political, intellectual and moral leadership, and secure the 'broad-based consent' of allied and subordinate groups to prevailing relations of economic and political domination" (Sum and Jessop 2013:201) was an indication of its hegemonic position in the market.

Not only are waste pickers more "loyal" – or subservient – but trading directly with them is economically advantageous to *M&G Fibras*. There is no reference price for post-consumer PET bottles, and the market is highly speculative. Availability is the number one factor determining price, which usually increases in the winter months due to a reduced consumption of bottled beverages, as discussed previously. Colour appears as the second most important attribute in the valuation process, with clear bottles of soft drinks being the most valued given their wider application. Nonetheless, according to Freitas, supply capacity also influences price. Big suppliers benefit from higher prices, precisely due to their supply capacity and the market power that comes with this. Hence, by trading directly with collectives of waste pickers, *M&G Fibras* can procure bottles at lower prices.

Notwithstanding, around the time I was carrying out fieldwork, direct trade accounted for a mere 5% of *M&G Fibras*' monthly demand for PET bottles, i.e. 50-60 tonnes; the other 95% was negotiated with wholesalers. Although very modest, the 2016 figure represented a noticeable increase from 2014, when only 1% of the PET bottles acquired by *M&G Fibras* were supplied by collectives of waste pickers. Freitas was working intensively to establish partnerships with such collectives, mostly in the state of Minas Gerais, where *M&G Fibras*' plant is based, as well as in the bordering state of São Paulo. The recycling company's decision to focus on these states is part of a strategy to reduce transport costs and therefore make the price of recycled polyester fibre and PCR-PET pellets more attractive. According to Luciano, half of the PET bottles discarded in Minas Gerais in a month would be enough to have *M&G Fibras*' plant operating at full capacity. However, as of September 2016, only 55% of the bottles procured by the company came from Minas Gerais, most of

which from two wholesalers with whom *M&G Fibras* maintained long-lasting relationships; the other 45% were shipped in, mostly from São Paulo and the Federal District, although also and to a lesser extent from more distant states, such as Ceará and Pará, in the northeast and north of Brazil respectively.

Although *M&G Fibras*' policy is sensible, not least because it results in lowering the greenhouse gas emissions associated with its business, its spatial selectivity when choosing suppliers corroborates the point made in subsection 9.2 with regard to the "politics of waste" (Gille 2010). Since recycling companies are concentrated in the southeast and south of Brazil, *M&G Fibras*' practice of selecting suppliers on the basis of their positionality vis-à-vis its industrial plant contributes to foreclosing the potential of bottles located outside of its preferred procurement area to become resources again, trapping them in their waste phase. The effects of this are felt both by the environment and by the most vulnerable participants of the recycling economy, i.e. waste pickers based in regions other than the southeast and south, particularly in remoter areas, whose vulnerability stems largely from their disadvantaged positionality in the recycling economy, and who are often pressured to accept prices below the market standard so as to be able to sell the materials they have reclaimed.

Three of the biggest challenges which *M&G Fibras* faces in the pursuit of direct trade with collectives of waste pickers, according to Freitas, are informality, their trade preferences and the peculiar nature of their relationship with wholesalers. Due to its strict accounting practices, *M&G Fibras* can only procure bottles from players who have a legal existence and are therefore liable to pay taxes, which implies the exclusion of a large number, if not the majority, of cooperatives and

associations of waste pickers. Among those which are formally registered, some prefer to trade recyclables as a bundle and not by type, a practice to which Ivan from *Brasil Limpo* had already referred (see Chapter 9). Such a preference benefits wholesalers, who are commonly players in more than one recycling market, whilst recycling companies usually specialise in processing one type of recyclable.

The relationship between wholesalers and some organisations of waste pickers is also an obstacle to direct trade: “I have seen nasty arrangements between wholesalers and waste pickers through my career, some of which resemble slavery”, according to Freitas. He claims that the former usually try to create a situation of economic dependence with their suppliers by donating carts, presses and advancing money, so as to inculcate in waste pickers a “duty to be loyal”, i.e. to maintain an exclusive trade relationship with them. Again according to Freitas, “players in the PET recycling market behave like banks: balances are cleared by the end of the day. Suppliers sell to whomever offers the best price on a given day. When you think you have managed to establish a partnership, a competitor comes and takes him away from you”. Wholesalers’ attempts at creating dependency ties with waste pickers are therefore a strategy to mitigate market uncertainty. Freitas claims that *M&G Fibras* does not engage in such practices and, thus, does not expect its suppliers to be exclusive; that is why he is constantly looking for new partnerships.

The relationships of patronage nurtured by some wholesalers are intrinsically ambiguous, and unfortunately inescapable for many of the most vulnerable: “While they play an important role in ensuring basic survival, they also tie poor households into networks of obligation and power relations that in the long run may not work to their advantage” (du Toit 2004:22). The pathway to breaking

these ties, according to Freitas, "starts with the establishment of networks of cooperatives to coordinate joint sales, but also involves a behavioural change on the part of organisations of waste pickers. In kind and cash funding should be demanded from the government and not be expected from trading partners. What *M&G* has to offer is fair prices, something wholesalers are not doing". Freitas' statement reveals how power imbalances are deeply ingrained in the structure of the PET recycling economy, with changes being expected from those agents who are in the least favourable position to make them. It also demonstrates *M&G Fibras*' discursive selectivity in identifying alternatives to facilitate direct trade, which carries a bias towards blaming the poor for their predicament while implicitly assuming that the oligopsonic and spatially concentrated structure of the PET recycling economy is optimal, therefore contributing to perpetuating its intrinsic imbalances. As Flores Berard and Holzscheiter contend, "discourse is constitutive of power by privileging certain perceptions of (social) reality and excluding others. Societal discourses shape and sustain discriminatory and stigmatizing practices (…) in which some human beings are muted while the speaking authority of others is naturalized" (2011:7).

Despite stressing the role of waste pickers, and to a certain extent that of the government, in ending patron-client relations in the PET recycling economy, Freitas recognises that *M&G Fibras*' deferred payment policy hinders direct trade with cooperatives. The company's attempt at mitigating the risks that space-time entails – associated both with transportation and the impossibility of attesting the quality of the materials procured *ex ante* due to its positionality – has resulted in the imposition of temporal selectivity over suppliers regarding the turnover time of capital, which waste pickers are often not in a position to conform to. As Sum and Jessop argue,

"some actors, some identities, some interests, some strategies, some spatial and temporal horizons, some actions will be better positioned than others to realize the possibilities or circumvent the constraints associated with a given institutional ensemble" (2013:68). In order to establish closer ties with collectives, the company was working to strike a balance between waste pickers' immediate need for cash and the company's concern with quality which underpins its policy.

One way *M&G Fibras* had found to partially address this concern was to pay for shipping costs in certain exceptional circumstances when the quality of materials was extremely good. Although the company does not usually set a minimum weight requirement to open negotiations – since suppliers are usually responsible for arranging and paying for freight – when responsible for bearing shipping costs, *M&G Fibras* requires a minimum of 8 tonnes of PET bottles for a medium sized lorry and 15 tonnes for an articulated lorry, and encourages collectives to continuously improve the density of bales, so as to reduce the impact of shipping on price. The main reason why *M&G Fibras* sets such baselines is because, on those rare occasions when it is responsible for paying for shipping, it hires the same haulage company that transports its final products to collect bales of PET bottles. The haulage company, however, requires insurance coverage for cargo which, according to Freitas, considerably increases the burden of transportation costs on the price of inputs: "Insurance coverage increases freight costs by approximately 50%. While an uninsured freight between Brasília and Poços de Caldas (881 km) costs around R$ 1.600,00, an insured freight between Belo Horizonte and Poços de Caldas (461 km) costs on average R$2.300,00". Freitas disagrees with the policy and thinks it should be revised, arguing that "in order to transport discarded PET bottles one

does not require the same assurances as for transporting PET pellets and polyester fibre, which are more valuable products". Because the practice of insuring consignments of PET bottles is rather unusual in the recycling market, *M&G Fibras* bears a cost that its competitors do not face, what gives the latter a comparative advantage over the former.

Another source of comparative advantage for *M&G Fibras*' competitors is their habitual unlawful behaviour, according to Freitas, leaving me to ponder the extent to which his accusations could provide a possible explanation for other recycling companies' unwillingness to partake in the research. He argued that *M&G Fibras* is regularly audited by international bodies and therefore practices irreproachable tax conduct, which could not be said of its competitors, who often do not play by the same rules and therefore are able to procure bottles at a much lower price. Confirming my fieldwork observations, he contended that tax avoidance practices are ordinary in the PET recycling economy, and referred to some of the numerous artifices commonly used by market players:

- *You come across all sorts of stratagems. From transactions made without an invoice, to fake invoices, 'half' invoices* [half the real value or volume of the transaction], *and 'boomerang' invoices* [used several times for different transactions]. *Some players also do fiscal engineering to enjoy fiscal benefits, avoid or pay lower taxes. Instead of concentrating their operations under the umbrella of one single company, for instance, some players dilute their businesses in small enterprises registered by figureheads who lend their name in exchange for some sort of advantage. Once one of these companies reaches the*

revenue limit to qualify as a small business, for instance, they start operating under another one, and so on.

Such fiscal manoeuvres create a chain reaction and jeopardise *M&G Fibras*' operations not only when procuring bottles, but equally when selling its products. Since the company is subject to a cost which some of its competitors are not bearing, it is sometimes forced to squeeze its profit margins to remain competitive, according to Alexandre Rocha, commercial analyst at *M&G Fibras*. Like Freitas, Alexandre complains about the lack of morality in the PET recycling market and reveals *M&G Fibras*' strategy to fight it:

- M&G Fibras *produces the best PCR-PET pellets available in the Brazilian market. We offer transparency in our processes and regularity in our products, but some buyers are not willing to pay for it. Instead, they prefer to get involved in tax avoidance schemes to have access to lower prices. It is a nasty market.* M&G Fibras *cannot fight it alone. That is why it is the company's strategy to have big corporations by our side, so that we can have some stability, minimize the harms caused by speculation and also avoid discussions about pennies.*

Although the market could probably do with an added dose of morality, what is really needed to correct the distortions caused by tax evasion practices is more than individual behaviour change; it is institutional change. More than upgrading moral standards and toughening law enforcement, there is an urgent need to fundamentally rethink the law and its basis, confronting its intended and actual effects. As argued in Chapter 1, charging taxes on post-consumer PET bottles and other recyclables discourages waste pickers from formalising their businesses, a goal

pursued by the National Waste Policy, since with formalisation comes the liability to pay taxes. More importantly for the purposes of this thesis, though, the levying of taxes on post-consumer PET bottles and their products encumbers recycling and forces producers to try and reduce costs to keep their products attractive in comparison with substitute commodities, with perhaps more deleterious effects for waste pickers.

Despite being domestic in scope, the market for PCR-PET pellet and recycled polyester fibre produced in Brazil is influenced by the market for substitute commodities, the most obvious of these being their virgin counterparts, which introduces an international aspect. According to Alexandre, the price of virgin plastic resins, mainly determined by operations in Asia, where the biggest producers are concentrated, affects the price of recycled PET in Brazil. Consequently, fluctuations in the exchange rate of the US dollar, as well as the price of crude oil – from which terephthalic acid, or PTA, used in the production of virgin PET, is made – also interfere with the price of PCR-PET pellets and recycled polyester fibre. Virgin and recycled PET, at least of the grade produced by *M&G Fibras*, with all its quality controls, have the same properties and affordances, after all they are essentially the same material. Still, they have a relational ontology in which one is set against the other as a different type of matter which, for that reason, is viewed differently (Gregson and Crang 2010). Since value is not an inherent property of materials, but rather a product of their sociality and exchangeability, a reciprocal construction between people and things (Appadurai 1986), their price is therefore not the same.

Matter is inexorably transient; its only constancy lies in its permanent state of becoming through actively participating in the processes of the world's ongoing

generation and regeneration (Ingold 2007). For this reason, authors like Gregson et al. (2010) and Richardson and Weszkalnys (2014) state that things are valued not only for what they are, as their state in any given moment is but a transitory stabilisation of their properties, but also for what they might become as they are endlessly being assembled, always turning into something else. I concur with this view, but would add that in the case of materials subject to recycling, like PET, their value is asserted not only based on what they might become, but fundamentally on the basis of what they once were, i.e. waste. The immanence of such materials as rubbish, which producers so strenuously try to obliterate as part of their marketing strategy (Hawkins 2009), does not seem to be forgotten by these very same producers once realised, i.e. once the waste they themselves helped to generate returns to the market as a post-consumer recycled resource. A market, after all, as Hawkins cautions "is a particular relational enactment of materiality. It produces a version of matter by making some aspects of it present and excluding others" (2011a:2003). Hence, if producers aggressively attempt to suppress the capacity of bottles to persist after a single use when occupying the position of sellers, on the other hand they are very conscious of it when in the position of buyers. Hence, in their existence as a post-consumer recycled resource is imprinted their past as waste, and with this comes the negative symbolism attached to waste as discussed by Douglas (1966). From such symbolism results the stigma of a second class item and the expectation of a lower cost, which provides yet further evidence that materiality matters and that waste has an ontological politics (Gregson and Crang 2010).

In the particular case of recycled polyester fibre, another international commodity not directly related to the PET market equally affects its price and, in

fact, also the price of virgin polyester fibre: cotton. According to Luciano Gileno, cotton and polyester are substitute products in some applications in the textile industry, which often mixes both fibres. The mixture rate is determined not only by the characteristics that producers want to achieve in the final product (e.g. absorption, resistance, wrinkling), but also by the price of one against the other. Although holding different properties, cotton and polyester fibre enable similar affordances, and in instances when their application is interchangeable, price plays a determinant role in buyers' decision to purchase one and not the other. Again, among the three, "recycled polyester fibre is the least valued by the market and therefore, its price should be the cheapest in order for it to be attractive to buyers", according to Luciano Gileno, operations manager at *M&G Fibras*.

The incidence of taxes on recycled PET reduces the potential price difference between it and substitute products, ultimately adding a financial pressure on the recycling sector to reduce production costs. Nonetheless, recycling PET in a middle-income country like Brazil is a labour intensive process. Most of the impact of such cost reduction pressures is therefore felt by waste pickers in the form of low remuneration for their work, as they are the most vulnerable agents of this highly power-asymmetric market. As Torres and Cornejo (2016) note after analysing the recycling market in Peru, the viability of recycling in low and middle income countries is dependent upon the low labour costs of unregulated workers. Beyond the environmental benefits that would result from the exemption of post-consumer PET bottles and its products from taxes, such a measure would also have a clear social impact.

Behind the causes identified by *M&G Fibras* for some of the challenges it faces when procuring PET bottles and selling PCR-PET pellets and recycled polyester fibre lie more structural constraints. What the company pinpoints as 'causes' are therefore not actual 'causes', but rather 'effects' of structures in place in the PET recycling economy. Behind *M&G Fibras*' discursive selectivity in the identification of such 'causes' is the transfer to other market players of the responsibility for change. If what the market needs is morality, and if *M&G Fibras* already guides its actions by high moral standards, for instance, then it can maintain its business as usual. For the company to recognise the structural nature of these challenges implies assuming its share of responsibility for promoting the transformation it wants to see. "Structure refers to the contingent outcome of diverse structuration efforts" and these are a result of "a complex assemblage of asymmetrical opportunities for social action, privileging some actors over others, some identities over others, some ideal and material interests over others" (Sum and Jessop 2013:150). In light of the market power it holds, *M&G Fibras*' structuration efforts are much more likely to succeed than those of waste pickers. Its strategic selectivity to ignore this matter only reinforces the social practices disrupting its operations.

11. *YPÊ* AND *ABIPET*: THE UNBEATABLE PET

All of *M&G Fibras* production of both recycled polyester fibre and PCR-PET pellets is consumed by domestic companies. Nearly 80% of *M&G Fibras*' produce is shipped to companies based in São Paulo, while the other 20% goes mostly to the south of Brazil. The Brazilian subsidiary of the American conglomerate *Dupont* and the textile company *Ober* are two of *M&G Fibras*' biggest buyers of recycled polyester fibre. In the PCR-PET pellets segment, some of *M&G Fibras*' main clients are the national producers of homecare products *Ypê*, *Bombril*, and *Minuano*, which together correspond to 60% of its sales. *M&G Fibras* also has business with companies producing vinegar, cooking oil, and regional soft drinks. All of these use PCR-PET pellets in the production of packaging, mainly bottles. According to Alexandre, at the time I was carrying out fieldwork, *M&G Fibras* foresaw a market trend in the bottled beverages industry to shift to PCR-PET pellets and was therefore in the process of negotiating its product with big players in this market segment.

When I heard from Alexandre that *Ypê* was one of *M&G Fibras*' biggest clients, I immediately felt relief. Having encountered so many obstacles in securing access to research participants as I moved outward through the recycling network, I finally saw some hope of a smooth and hassle-free experience. Prior to starting this PhD, I was an associate lawyer at a firm in Brazil, and had worked on a case representing the interests of one of *Ypê*'s partners. I maintained a friendly relationship with the company's legal department and was occasionally in touch with them. I reached out to them and had my visit authorised with one email. The legal

department put me in contact with *Ypê*'s environmental department, which was responsible for hosting me during my visit to the company's headquarters and main plant, located in Amparo, 177km from Poços de Caldas, where *M&G Fibras*' plant is situated.

In this chapter, I will draw on my experience at *Ypê*, as well as on my interview with Hermes, communications manager at *Associação Brasileira da Indústria do PET – ABIPET*, the Brazilian Association of the PET Industry – to examine and problematise some of the factors on the basis of which producers make decisions about product design. The chapter is primarily centred on material, economic and semiotic aspects related to the use of PCR-PET pellets – in comparison with virgin PET pellets and HDPE – as well as of pigments and PVC heat-shrink sleeve labels in the production of PET bottles. The motivations underpinning such product design choices are debated in light of their impact on recycling, understood both as a technical process and an economic activity. I should note, however, that the relevance of this chapter does not stem so much from the arguments contained within, most of which are not new; rather, it lies in the data collected at *Ypê* and at *ABIPET*, which adds a different perspective and further layers of grounding to arguments developed throughout this thesis, and therefore strengthens them.

The inclusion of considerations about my engagement with *ABIPET* here is based on three main reasons. First and foremost, because the main topic of my conversation with Hermes concerned disturbances to recycling caused by producers when designing packaging for their products, which is complementary to the topics I discussed with *Ypê*'s employees during my visit – not least because *Ypê* produces its

own packaging. Second, due to *ABIPET* being a sectoral organisation which represents the interests of some of the biggest producers of virgin PET resin, manufacturers of PET-based products and PET recyclers in Brazil, it allows for a more systemic and thorough understanding of how the PET recycling economy – and the wider economy – operates. Third, even though when I set out on my *follow-the-thing* journey I proposed to do so from the moment PET bottles were reclaimed at *Lixão da Estrutural* up to the point where they were transformed into a new product ready to re-enter the consumer market, the adoption of the Global Production Network approach as a methodological framework in this thesis demanded a recognition that production systems are not linear structures, but rather an intersection of vertical and horizontal connections. "The choice of the term 'network' in GPN analysis is not mere semantics, therefore, but reflects a particular ontological understanding of how socio-economic systems are organized and function" (Coe and Yeung 2015:15).Throughout this thesis I have tried to cater to such horizontality, including considerations about my engagements with actors not directly involved in the recycling network I traced, but who nevertheless interfered with its structure and shape, such as SLU-DF's director, Heliana Kátia, the wholesaler *Capital Recicláveis*, and now *ABIPET*. The highlights of my interview with Hermes are intermingled with the data I gathered during my visit to *Ypê*, which provide the guiding thread for this chapter.

Amanda and Isabelle, environmental analysts at *Ypê*, took me on a tour around the company's industrial park, beginning at the warehouse where PET pellets are transformed into new bottles for washing-up liquid. They introduced me to line managers and operators along the way to answer some of the more complex

questions I posed to them. *Ypê* uses a mixture of virgin and PCR-PET pellets in the production of bottles for washing-up liquid, concentrated detergent and some disinfectants (see Figure 29). Even though the PET bottle manufacturing machinery could run with 100% PCR-PET, as a rule the company does not use more than 75% recycled content, for aesthetic reasons. PCR-PET pellets are, in general, less translucent than virgin PET pellets and *Ypê* considers bottle translucency key for marketing reasons, especially when the contents are transparent, as in case of its clear washing-up liquid. Changes in the mixture ratio do not affect process losses or the productivity of the machines, because *Ypê* sources PCR-PET pellets from high quality producers. In fact, despite producing homecare products, *Ypê* only uses food grade PCR-PET pellets in its packaging. According to Gil, a manager in *Ypê*'s Packaging Development Unit, the company has faced challenges in the past when trying to incorporate PCR-PET into its packaging due the poor quality of pellets. They were forced to reduce the processing speed of their machines in order to minimize process losses and damages to machinery caused by contaminants present in pellets. He claims this is no longer an issue, thanks to technological improvements. The only downside of PCR-PET pellets, according to him, is their slight opacity compared to virgin pellets, which causes a loss of transparency in bottles.

Figure 29. Bottles of washing liquid produced by *Ypê* using a mixture of virgin and PCR-PET pellets. November 2016.

Not only aesthetics determines the proportion of PCR-PET pellets used in the mixture; its price compared to virgin PET pellets is also decisive. According to Deyse, an analyst at *Ypê*'s Procurement Unit, "the price of PCR-PET pellet oscillates a lot and is often not very attractive compared to the price of virgin PET", which reinforces the argument developed in Chapters 1 and 10 in favour of exempting recycled PET from taxes in order to encourage producers to buy it. Due to the confidential nature of the agreements which *Ypê* has with its suppliers, Deyse could not disclose prices, however. To give me a sense of how price fluctuations of PCR-PET pellets affect purchases, Amanda and Isabelle provided me with some statistics. Between January and July 2016, PET bottles for washing-up liquid produced at *Ypê*'s plant in Amparo were being made with 70% recycled content. This ratio, however, fell to less than 30% between August and October, due to price increases. Although the company always uses some PCR-PET in its packaging in light of its commitment to mitigating its environmental impact, it is clear that this is not its top priority.

Restating what other research participants had told me, Deyse explained that the PET recycling market is seasonal, with the price of PCR-PET pellets generally falling during summer, when the availability of bottles peaks due to an increase in consumption of soft drinks and bottled water, and increases during winter, when consumption of such beverages decreases considerably, driving the availability of bottles down. Subsequently, purchases of PCR-PET pellets tend to shrink during winter and rise during summer, to take advantage of these price fluctuations, while purchases of virgin PET pellets follow an inverse trend, unless the US dollar appreciates excessively, making virgin PET less attractive. According to Deyse, USD 1 should be equal to or lower than BRL 3.20 as an average baseline in order for virgin PET pellets to be more attractive than recycled. She added that the price of virgin PET pellets used to be a lot more stable than that of PCR-PET pellets, but the financial crisis that hit Brazil in 2012 brought turmoil to the market, with the consequent devaluation of the Brazilian Real negatively affecting the price of international commodities.

Ypê's capacity to take advantage of these price fluctuations by buying and stocking pellets when the price drops is, however, limited by space. The company's plant in Amparo underwent a reorganisation, and part of the warehouse allocated for the storage of inputs was repurposed to stock finished products. Consequently, as of 2016, *Ypê* could store the equivalent of 30 days' worth of inputs in its plant in Amparo. Although space, or the lack thereof, was a limiting factor for *Ypê*, its impact on the company's business was much less severe than on waste pickers. If, for the first, it implied restricting the extent to which they could benefit from market fluctuations, for the latter it meant substantially restricting their selling prospects

both in terms of trading partners and price. More importantly, *Ypê* is in a position to get around the limitations imposed by space if it so wishes, expanding its industrial park, whereas waste pickers generally do not have any alternative.

Space also has a bearing on the final price offered by *Ypê*'s suppliers. *Ypê* buys virgin PET pellets from *M&G Polímeros Brasil S.A.*, sister company of *M&G Fibras*, and *PQS (Petrobras*), the only two producers of virgin PET pellets in Brazil, both based in the Northeastern Brazilian state of Pernambuco. PCR-PET pellets, on the other hand, are sourced from *M&G Fibras*' plant in Poços de Caldas, in the state of Minas Gerais, and *Globalpet*, the latter based in São Gonçalo, in the state of São Paulo. Deyse tells me that *M&G Fibras* usually has a price advantage over *Globalpet* when trading PCR-PET pellets with *Ypê*, due to their respective locations. *M&G Fibras* is subject to the interstate rate of ICMS, a state sales tax, i.e. 12%, when trading with Ypê, based in São Paulo, while *Globalpet* has to pay the internal rate of ICMS, i.e. 18%. Putting aside discussions about the policy of charging taxes on products produced with recycled content, Deyse's observations corroborate the argument developed in Chapter 1, where I discussed the spatial distortions to which the current legislation regulating ICMS gives rise, incentivising companies to procure materials from suppliers located further away in other states, instead of incentivising local transactions.

At the time I visited the company, *Ypê* was negotiating with *CPR*, based in Rio de Janeiro, to start buying PCR-PET pellets from them as well. According to Deyse, it is not primarily price that drives *Ypê* to procure from different companies, as this is usually fairly homogeneous across suppliers for both virgin and recycled PET. The price of virgin PET pellets at *M&G Polímeros Brasil S.A.*, for instance, is

indexed to ICIS, the world's largest petrochemical market information provider, and hence there is no room for negotiation. *Ypê* endeavours to maintain a lasting relationship with suppliers, but strategically does business with more than one company to avoid being at the mercy of a single supplier, hence minimizing the risks of having its operations disrupted by eventual shortages. It does so even when the price of one is slightly higher, obviously procuring a smaller amount from the more expensive company.

Although wary of any disruptions that might be caused to its production – e.g. loss of transparency in packaging, shortage of inputs – and proactive in taking precautionary measures to avoid them, *Ypê*, like most producers, does not take the same care to prevent disruptions that its production methods might cause in the recycling process. This is made clear by the company's use of PVC heat shrink sleeve labels, increasingly deployed as a marketing device to attract consumers' attention. According to Hermes, communications manager at *ABIPET*, PVC sleeve labels are persistently being associated with higher sales by marketing strategists due to it enhancing the shelf presence of products, making it possible for packaging to be designed in different and compelling new forms. Hermes' claims are in line with a packaging study by Nielsen, a leading provider of market information and insight worldwide, commissioned in 2013 by Eastman Chemical Company, a global manufacturer of chemicals, plastics and fibres, which states that "shrink-sleeve labels provide drastically improved billboard effect, creating stronger emotional connections and increasing at-shelf performance and trial" (Eastman Chemical Company 2013).

11. Ypê and ABIPET

As partial as this study may be, commissioned as it was by a producer of heat-shrink sleeve-labels, its findings seem to be circulating as a rhetorical artifice to justify the use – as well as to actually promote the growth – of the heat-shrink sleeve-label segment. Precisely due to being increasingly recognised as a marketing device, Hermes contended that the beverage industry as well as other industries making use of such labels, such as *Ypê* and other companies in the homecare sector, would be extremely unwilling to phase them out. He further explained that, although sleeve labels can be made with different plastic resins, PVC is the preferred type among producers, due mostly to its lower cost, despite the trouble it causes in the PET recycling process.

Although members of *Ypê* staff claimed not to be aware of the disturbance PVC sleeve labels are causing to PET recycling, the situation with these labels is an indication that product design is usually at the service of a limited level of producer responsibility grounded in the large scale transfer of issues concerning the afterlives of products and packaging down through the recycling network, and most pronouncedly to the most powerless players partaking in it. Either by omission or commission, producers attempt to "keep these problematic qualities of the bottle [and its label] out of the market frame, to contain the socio-material meanings of the container" (Hawkins 2011b:546), privileging profitability instead. Based on the recyclability of PET – after all, PET is unarguably recycl*able* – producers are able to leverage their environmental profile without, however, truly caring whether bottles are indeed being recycl*ed*, even if all they had to do in order to guarantee that was to switch the type of resin used in the label.

11. Ypê and ABIPET

To prove that recyclability is no guarantee of recycling, one only has to contemplate *Ypê*'s own procurement practices. Although the company uses other types of plastic, such as HDPE, in the production of some of its packaging, PET is the only recycled resin the company buys. Gil explains that they have tried using recycled HDPE in the past, but gave up on the idea because it retains the odour of matter that has come into contact with it, which is quite problematic given that most waste collected in Brazil is unsorted, and recycled HDPE therefore smells of leachate – contaminated water from dumpsites. According to him, this is only one of the many disadvantages of PCR-HDPE when compared to other recycled plastic resins, and particularly to its most direct competitor, PET. Due to the poor quality of PCR-HDPE pellets available in the Brazilian market at the time of fieldwork, *Ypê* would need to have special and dedicated machines if it were to use it. PCR-PET pellets, at least those acquired by *Ypê*, on the other hand, did not require special treatment, running smoothly in all of the company's relevant machines.

Guiding me through the details of the bottle manufacturing process, Gil further tells me that it is comparatively easier to control for quality in the production of PET bottles than of HDPE. PET pellets are initially molten, injected into a mould cavity with a test tube shape to produce preforms that are then allowed to cool. Preforms are later reheated and blown into bottles. In the case that the pellets contain impurities or contaminants, the bottles present holes that are easily perceptible with the naked eye. Unserviceable PET bottles are sold to recycling companies to be crushed and transformed into pellets again in a closed-loop cycle. HDPE (as well as PP) pellets, on the other hand, are usually extruded, i.e. pushed through a die opening, producing hollow tubes that are subsequently blow-moulded into bottles. If

contaminants or impurities are present, holes are not usually apparent. Sometimes they are only noticeable once bottles are filled and the content leaks; “a waste of money, time and resources”, according to Gil.

The advantages of PET over HDPE, however, are not restricted to the PCR segment. Gil says that in addition to being overall cheaper than HDPE, for example, PET pellets deliver further savings since bottles can be made with less material per unit than their HDPE counterparts, so the final cost per unit is considerably lower. Gil gives the example that when *Ypê* used HDPE pellets in the production of its bottles for washing liquid, it consumed 17.5g of resin per bottle. After switching to PET, *Ypê* uses only 13g of resin per bottle: a 25% reduction. These benefits are confirmed by Hermes who further claims that “PET has the best touch-feel, is the most transparent and brilliant, and the easiest to shape amongst the thermoplastic resins used for packaging, and is therefore very appealing for marketing purposes”. He explains that PET offers strong mechanical and chemical resistance, i.e. barrier properties that prevent both the contents from leaking/escaping and exterior substances from getting in, hence why the soft drinks, water and cooking oil segments are dominated by PET packaging. Still according to Hermes, price is also an important factor. The consolidation of a strong PET industry in Brazil with capacity to produce around one million tonnes per year of virgin PET pellets, not to mention the sizeable mills in the United States and in Asia, has meant an increase in the supply of PET pellets in the market, naturally driving prices down and consequently making PET more competitive, price-wise, in comparison with other plastic resins: “This along with the other factors I have mentioned, makes PET unbeatable”.

All these benefits help to explain not only *Ypê*'s preference for PET to the detriment of HDPE – which is opaque, rigid, not very resistant to gases, and comparatively costlier – but also the global trend verified in the packaging industry to progressively switch from HDPE to PET to which Cleusimar had referred (see Chapter 7.2)" and which Hermes confirmed in the context of our conversation about *PET lixo*. According to him, "until very recently PET packaging only came in three colours", i.e. clear (high end soft drinks, e.g. Coca-Cola and Pepsi), green (regional soft drinks) and blue (water bottles); "the last couple of years, however, witnessed the entrance in the market – mainly in the dairy, home and personal care sectors – of PET bottles coming in a variety of different shades as a result of the switch from HDPE to PET driven by the singular properties of the latter". Red bottles of ketchup, yellow bottles of mustard and opaque white bottles of milk, just to mention a few, all previously made from HDPE, are now being produced with PET.

The driving forces motivating the switch between resins reinforce the aspects that producers usually take into consideration when designing their products. Marketability and profitability stand as major concerns in the design process and evince the still limited general level of responsibility felt among producers, who often disregard the afterlives of their products and packaging. Even those who have taken into consideration the recyclability of PET before switching resins are not exempt from critique. Under the extended and shared producer responsibility approach, increasingly promoted by countries in their legislation and adopted as a principle by the National Waste Policy enacted in Brazil in 2010, producers are expected to design their products in a manner that allows for their reutilisation, or recycling if reutilisation is not possible, considering technical limitations. Hence,

producers should have made a full life-cycle assessment to appraise the impact that their design choices will have on the recycling economy, and take precautionary measures to mitigate these impacts and guarantee the recyclability of their packaging. Perhaps producers do not even know that the PET recycling process is organised around colours, and therefore might not be aware that the introduction of new colours to the market, in order to maintain the identity of their products, is disrupting the recycling economy.

Hermes, however, argues that "the problem with coloured PET is that waste pickers are not sorting them correctly", referring to the fact that bottles coming in colours other than clear, green and blue are usually baled mixed together – the "carnivalesque bales" that Freitas from *M&G Fibras* referred to. The wording of his statement is critical, particularly in light of the capacity of "discourses in themselves [to] act as powerful structures of social conventions (meaning-conventions) by limiting the potentially indefinite ways of talking about and perceiving social and material reality" (Flores Berard and Holzscheiter 2011:4). Hermes portrays "the problem" of *PET lixo* as emerging from waste pickers not doing their job properly; according to him, it is not a matter of design or producer negligence. The stance he takes as communication manager of *ABIPET* is a clear attempt to frame the issue in a way that favours the interests of the industries of the sector and, consequently, to transfer to waste pickers a responsibility that lies primarily with them as producers, therefore paving the way for business to remain as usual.

Although Hermes conceded that the fact that PET bottles coming in colours other than green and blue were available only in small quantities encumbered waste pickers, who often do not have access to storage space, he maintained that "this

limitation could be overcome if they were able to better collaborate amongst themselves, combining their stocks to have enough volume to sell". Joint sale is indeed a promising strategy to solve many of the logistic challenges associated with *PET lixo*, besides being a robust tool to leverage waste pickers' position in the recycling economy, increasing their bargain power. Nonetheless, as I have argued elsewhere (Pereira da Silva 2019), waste pickers cannot be penalised or held responsible for solving a problem they did not create. If producers want waste pickers to figure out an answer to the logistical conundrum originating from their design choices, they should at least equip them with the necessary assets and tools, instead of simply transferring to waste pickers the burden of facing this issue with their meagre resources. Still, waste pickers would only be a part of the solution since, as Hermes himself acknowledges, the industry is yet to develop applications for the different colours of PET entering the – until recently trichromatic – recycling market. Hence, one way or another, producers would need to change their practices so as to incorporate recycled PET into their processes, therefore creating a closed loop cycle for their packaging.

ABIPET's communications manager was positive that the *PET lixo* problem will be solved in the near future, grounding his prediction in the example of green and blue PET bottles which, according to him, were also problematic when first introduced into the market. Hermes claimed that once a consistent volume of bottles of the same colour is being produced, it becomes financially viable for someone to develop an application for this material that can be sustained, so that the investment pays off. He cited the example of opaque white PET bottles of milk, arguing that titanium dioxide, the pigment responsible for giving the bottle its white colour, is the

same used by the textile industry to dye fibres white. PET bottles of milk, he suggested, could then be used to produce white recycled polyester fibre, an application that was close to becoming reality, according to him. Attempting to reinforce this line of thought, Hermes stressed the need to put the *PET lixo* issue in perspective, both in terms of what they represent in light of the PET packaging universe and how the phenomenon relates to the economic crisis Brazil has faced since 2012.

First, Hermes told me that the soft drinks, bottled water and cooking oil industries correspond to approximately 85% of all the PET packaging produced in Brazil, and argues that "these segments have historically used clear, green and blue bottles, all of which can be recycled without hurdles". The remaining 15% correspond to home and personal care products, other beverages (e.g. juices and isotonic drinks), sauces and vinegars, the vast majority of which are usually packed in clear flasks, according to him, therefore claiming that coloured PET accounts for a minor proportion of the volume of PET bottles consumed yearly in Brazil. Although his line of thought seemed fairly reasonable at face value, when analysed in more depth his intent to downplay the responsibility of producers became evident.

Notwithstanding the low yearly production of coloured PET bottles compared to clear, green and blue, the fact that the former are not being recycled implies that they are subject to a cumulative effect. The environmental consequences are the most obvious and prominent, especially in the form of PET bottles accumulating in disposal sites and elsewhere, but the socioeconomic implications are not negligible either. The inefficient vicious cycle which *Recicle a Vida* triggered upon deciding to start dumping *PET lixo* back at *Lixão da Estrutural* (see Chapter

7.2) is one example. The cooperative lost vital money buying bottles for which there was no market and, having lost hope of finding a buyer for them, dumped them in the only disposal facility available in the area, which happens to be the sae place from which it sources recyclables, therefore exposing itself to further losses. Besides, as small as the *PET lixo* issue might be, it still is an issue as producers have a legal obligation to work within what is technically feasible to guarantee that their products and/or packaging are reusable or, at least, recyclable. Not least, the *PET lixo* issue has potential for quick scalability as the trend to produce bottles in different colours gains traction as a strategy to attract consumers' attention.

As a second counterpoint, Hermes contextualised the *PET lixo* issue in light of the economic crisis that hit Brazil in 2012 and is still ongoing, claiming that the origins of the problem are not sectoral, but rather systemic: "the problem lies outside the PET market. The automotive industry has shrunk by 30% in the last two to three years. A substantial reduction like this in a sector that was one of the biggest consumers of PCR-PET directly affects the recycling market". Other sectors, equally strategic to the PET recycling industry, such as textiles, have also experienced drastic drops in the past few years, culminating in an excess supply of PET bottles in the recycling market and consequently in the emergence of the *PET lixo* issue, according to him: "Whenever there is excess supply, buyers prefer the best quality materials and the worst are left behind [referring to coloured PET]. (…) [It is] not because recycling is not taking place –because the operational capacity of recycling companies has not diminished in the last three years – but because demand has fallen".

Although there may be some truth in Hermes' statement, as the crisis has indeed affected the economy with potential reverberations across the PET recycling industry, his argument should be interpreted *cum grano salis*. As Freitas from *M&G Fibras* pointed out, the economic crisis has driven the consumption of bottled beverages down. It is not a coincidence that both he and Valéria from *Brasil Limpo* were complaining about the low availability of bottles in the market. Hence, the extent to which the *PET lixo* issue could be explained as a matter of excess supply is contestable. In any case, the solution, as envisioned by *ABIPET*, lies again in the hands of waste pickers, who are expected to keep on sorting, baling and storing *PET lixo* until the crisis is over, as is clear from Hermes' advice to them: "I tell waste pickers, if you have storage space, let them [bales of *PET lixo*] sit there for a while, because this is saving, my friend. Do not throw them away. Tomorrow you will sell them for a better price". Whether the better days foreseen by Hermes will indeed arrive or whether they are merely a sham through which the PET industry washes its hands of responsibility for the *PET lixo* issue, time will tell. Still, it is interesting to see how discourse can be used as a captivating weapon to transfer responsibility to the least empowered, making them believe they have something to gain, even if there is no certainty about that.

12. CONCLUSION

> *What actors intentionally do always generates chains of unintended consequences and it is implausible to deny that some of these manifest their power. Of course, those which frustrate their intentions may signify a lack of power to control events, but, as argued earlier, we can properly hold responsible, or accountable, those who have the power to advance or harm others' interests but fail to realize or attend to this.*
>
> Lukes (2005:76)

The introduction to this thesis started with an epigraph by Peet and Hartwick containing a vision of development which I would fully endorse, but for one detail included in its final sentence: "Development is optimistic and utopian – it means changing the world for the better, *starting at the bottom rather than the top*" (2015:3 emphasis added). Although I understand where the authors are coming from, presenting development as a necessarily participatory and democratic endeavour, I believe that responsibilities towards promoting development should be more evenly and fairly distributed between those at the bottom and those at the top, according to their respective capacity and power, along the lines of the principle of common but differentiated responsibilities that guides international environmental law. If people at the bottom are perhaps more interested in "changing the world for the better", since they will likely feel most of the benefits accruing from this change due to their disadvantaged position, this does not free people at the top from the responsibility to actively promote and enable such change. The epigraph at the beginning of this conclusion, containing some of Lukes' considerations about power, serves as a

counterpoint of sorts to the bottom-up directionality of development envisioned by Peet and Hartwick, and draws attention to the fact that with power comes responsibility, therefore suggesting that development should be as much a bottom-up as a top-down effort. It requires a degree of commitment towards anticipating the possible effects of one's actions and producing a positive impact in the world through one's activities – what goes beyong pure cost reduction and/or profit maximizing strategies –, as well as an effective engagement with the stakeholders affected by one's activities to prevent, mitigate and remedy any side effect. Such degree of commitment – and therefore such vision of development – is not yet observable in the PET recycling economy in Brazil.

My motivation to carry out this research was in response to a dissatisfaction with the distribution of responsibilities for promoting change that is predominant in the prevailing academic approach to promoting waste pickers' empowerment. Through this thesis I have argued that the excessive focus on cooperatisation and formalisation has led to overburdening waste pickers with the responsibility to eradicate their own poverty, whist neglecting the role that other actors have in perpetuating their underprivileged socioeconomic position. The very nature of the cooperatisation and formalisation approach results in a focus on local-level processes, as if "changing local conditions [was] the key to development"; however, "attention to positionality highlights the incompleteness of such accounts", since "if positionality matters, no amount of tinkering with local conditions is sufficient to bring about development" (Sheppard 2002:320–25). Such methodological bias towards local-level processes contributed to a problematic focus on proximate rather

than root causes of waste pickers's poverty in ways that were detrimental to their empowerment.

What is more, the dualist view of the economy often shared by proponents of the cooperatisation and formalisation approach, which implies an understanding of poverty as a residual condition associated with being left out of the formal economy, provides a justification for the maintenance and further consolidation of our current uneven development model. As Hickey contends, "the poverty reduction agenda [post-Washington consensus] seems peculiarly conservative regarding the forms of change it advocates, notably in its reluctance to challenge the forms of power relations that underpin uneven development" (2008:352–54). This thesis sought to challenge these forms of power relations within the PET recycling economy in Brazil by exploring the adverse incorporation of waste pickers within that.

The primary academic contribution of this thesis lies in putting forward novel theoretical and methodological frameworks that deviate from the Social and Solidarity Economy scholarship and move beyond the local-level case study approach traditional of investigations concerned with the causes of waste pickers' poverty. Empirical findings of this thesis supported the dismissal of the dichotomy between formal and informal economy upon which said investigations were grounded, and evinced the deliberate opacity of the recycling economy engendred by market players as an artifice to conceal illegal arrangements to evade taxes. One could even hypothesize that such opacity might have been a key factor discouraging other scholars from problematizing waste pickers' poverty in light of their positionality in the recycling economy. In any case, fieldwork data suggests that such illegal practices are just as prevalent among players of the so-called formal economy

as they are assumed to be in the informal sector, despite the fact that illegality is often described as a distinctive characteristic of the latter.

Having the notion of adverse incorporation as a theoretical tenet, and therefore taking as an assumption that waste pickers are already an active part of the recycling economy, it has been the aim of this thesis to investigate how the recycling economy is organised and how and in what ways this organisation is unfavourable to waste pickers. Using Cultural Political Economy as a theoretical lens, based on the segmentation of the economy into four dimensions – i.e. political-economic, semiotic, material, and spatio-temporal, with emphasis on the last two – it has been my ambition to "denaturalise" and "re-politicise" the prevailing academic approach that neglects the "contested origins of discourses, practices, processes and structures" that constitute the recycling economy, "giv[ing] them the form of objective facts of life" (Sum and Jessop 2013:163).

I have demonstrated, for instance, how in the political struggle to deal with the materiality of waste, particularly of coloured PET bottles and PVC-sleeve labels, different actors – both directly and indirectly involved in the recycling network under analysis – ascribe different and often conflicting meanings to PET bottles according to their convenience and interest, which more often than not results in transferring to waste pickers most of the burden and little of the benefits associated with recycling. I have also discussed how differential access to space and mobility, and the peculiar temporality that follows from such difference, affects actors in the market, and how in managing the risks associated with their positionality in the recycling economy, in light of the spatio-temporal dynamics that derive from the concentration of recycling companies in the Southeast and South of the country, actors often overburden waste

pickers and jeopardise their interests. The discourses used by actors to justify their practices and consolidate their market position were also studied and yet again indicate an encumbrance for waste pickers, who are frequently blamed for inefficiencies in the system, and accused of being unreliable and deceitful. The inconsistencies deriving from the institutional environment in which the recycling economy is immersed, particularly as concerns taxes levied on the movement of recyclables across the country, were also analysed and their role in preventing cooperatisation and in widening some of the distortions inscribed in the structure of the recycling economy substantiated.

The Global Production Network approach was the methodological framework chosen to guide this investigation, exploring "the interface of structure and agency, flows and territories, culture and economy to overcome such unhelpful and ultimately artificial dualisms" (Coe et al. 2008:289). Its use, along with follow the thing as a method, has allowed me to let economic processes set the scope of the research, exploring the macro while concomitantly examining the micro, therefore accounting for multi-scalar processes that are implicated in the perpetuation of waste pickers' underprivileged socioeconomic condition, but which were nevertheless neglected by the cooperatisation and formalization literature. While primarily focused on the strategies deployed by economic actors to pursue their interests, the Global Production Network approach is also "attuned to the wider structural and capitalist constraints upon those actions, and the ways in which strategies and actions can in turn rework and reshape these wider structural constraints" (Coe and Yeung 2015:18), a concern which is not observed in the current scholarship approach to the study of waste pickers' poverty.

The combination of these theoretical and methodological frames and the emphasis given to the material and spatio-temporal dimensions of the economy is a reply to the calls made by Coe et al. (2008) and Hudson (2008) to bring together the Cultural Political Economy and Global Production Network perspectives and to further explore its underdeveloped areas. Using this conjoined framework, it was possible to identify some of the hurdles to cooperatisation and formalisation and, most importantly, to unveil the political-economic, semiotic, material and spatio-temporal mechanisms that sustain waste pickers' adverse incorporation into the recycling economy and constrain their power, capacity to capture value, and the extent of their embeddedness in the economy.

If on the one hand the application of this conjoined framework allowed for a more holistic understanding of the processes and mechanisms sustaining waste pickers' adverse incorporation into the recycling economy, on the other the empirical findings of this thesis contributed back to the advancement of its theoretical and methodological framework. By demonstrating the entanglement between space-time and the structure of the recycling economy, the thesis evinced the importance of classifying space-time not merely as a frame of reference for semiotic and structuration processes – usually regarded as the core of the Cultural Political Economy theory –, but as a fourth dimension of the Cultural Political Economy analytical toolkit.

The empirical findings of this thesis also speak back to the Global Production Network literature. They reinforced the validity of applying the Global Production Network approach as a methodological framework and of follow the thing as a method to study the afterlives of commodities – and not just their

production and consumption phase, as commonly found in the literature – even when these do not physically cross national borders, therefore broadening up the scope of application of these approaches beyond their usual object and directionality. The application of the Global Production Network approach revealed the plurality of governance structures in place in the PET recycling network in Brazil, which as a market controlled by a few buyers, but structured around brokers, is based on forms of coordination that emanate from intermediaries – similar to what Crang et al. (2013) observed in their case study of the global commodity chain for used clothing and end-of-life merchant ships –, and not only from lead firms. As Bair contends, the GVC governance theory "scale down the concept of governance from a characterization of the chain in its entirety to a description of the mode of coordination prevailing at a particular link in the chain" (2008:354), i.e. especifically that between a lead firm and a supplier. An examination of end-of-life or postconsumer networks – and for that matter also of other markets marked by the presence of intermediaries –, however, evinces that governance can emerge not only from the top, i.e. from lead firms, but also from the middle, i.e. from brokers.

The complex governance structure previling in the PET recycling network renders it impossible to categorise it according to the fivefold typology proposed by Gereffi et al. (2005) on their work on Global Value Chains – i.e. market, modular, relational, captive, and hierarchy types of governance –, since it contains elements of more than one of these types. While requirements made by wholesalers and recycling companies with regards to how PET bottles are to be sorted and baled indicate a resemblance between the PET recycling network and modular value chains due to the presence of standards, the dependence ties engendred by wholesalers in their

relationship with waste pickers points towards an alignment between the PET recycling network and captive value chains.

The research findings further demonstrated the importance of accounting for materials circulating in production networks and the semiotic processes that weave them together, dimensions to which the Global Production Network literature has so far been as inattentive as its predecessor chain approaches, such as the Global Value Chain scholarship. In this respect, the thesis supplements the Global Production Network approach highlighting how the material characteristics of things going on in these networks, as well as the meanings, discourses and imaginaries that permeate and perpetuate them, intersect with their institutional and territorial context – underscored by the GPN literature – to shape the global economy.

In so doing, the thesis also speaks back to the literature on materiality, marked by a fierce debate around the agency of things. Putting forward a non-anthropomorphic understanding of agency as the capacity to act independently, and privileging the vantage point of things rather than humans', the thesis acknowledges the constraints imposed by pigments, PET bottles and PVC sleeve-labels to the recycling process as legitimate manifestations of their agency, or 'thing-power' (Bennett 2010b), which is corroborated by the *reactions*, understood as *responses* to preceding external stimuli, they evoke from other agents partaking in the recycling network. Beyond abstract theoretical discussions and extrapolating the scope of this thesis, the adoption of a non-anthropomorphic understanding of agency has profound practical implications, challenging our way of existing in the world. The recognition of non-human agency forces us to admit that non-humans have a life of their own which is independent and, most importantly, not subordinated to ours.

Fundamentally, this invites us to reconsider and pursue a more balanced relationship with the planet.

On a more practical level, these findings suggest that the effort to empower waste pickers should move beyond cooperatisation and formalisation, since their empowerment depends on reversing the dynamics of adverse incorporation to which they are subject as participants of a highly power-asymmetric recycling economy wherein competition is generated through "forms of exploitation that perpetuate extreme levels of precarity and vulnerability for the labour force, and feed into a reinforcement, rather than alleviation, of chronic poverty" (Phillips and Sakamoto 2012:308). This is the main take away message of the thesis. As Hickey and du Toit contend, challenging adverse incorporation "involves shifting the frame from policy to politics and from specific anti-poverty interventions to longer-term development strategies, particularly in terms of industrialisation and labour market restructuring, moves towards developmental states and supporting shifts from clientelism to citizenship" (2007:7).

Some possible starting points would be to exempt recyclables and products made with recycled content from taxes, or at least to lower the tax rate to which they are subject, so as to foment the recycling economy; to enforce laws requiring producers to design their products with the recyclability of their packaging in mind, pressing them "to change materials and processes in ways that are meaningful for health and environments, not just for profits" (MacBride 2013:183–84) through the establishment of clear incentives for compliance and penalties for those found to be breaking the law; and to encourage the decentralisation of the recycling economy in order to enable direct trade between waste pickers and recyclers and break vicious

dependency ties between market players and regions. These changes would not only favour the empowerment of waste pickers, but would equally contribute to making recycling economically viable without the hyper exploitation of their labour force.

Chief among the necessary changes, however, is behavioural change among actors partaking in the recycling economy, particularly the most powerful. Resuming the discussion which inaugurated this conclusion about power and responsibility, I draw on Lukes again to argue that "if we think of powerlessness as an *injustice*, rather than as bad luck or misfortune, is that not because we believe that there are those in a position to reduce or remedy it?" (2005:68). So far public officials, wholesalers, recyclers and producers have been blind to said injustice, diverting attention away from the power relations inscribed in the recycling economy in favour of a cost reduction and/or a profit maximizing strategy, preferring instead to blame waste pickers for their misfortune and placing in their hands the responsibility to organise as a professional category to carve their way out of poverty.

However, if we consider that the exercise of power "involves the assumption that the exerciser(s) could have acted differently" then "an attribution of power is at the same time an attribution of (partial or total) responsibility for certain consequences" (Lukes 2005:57–58), which implies an acknowledgment that wholesalers, recycling companies, sectoral organisations, government bodies as well as packaging producers are implicated in reproducing the conditions that lead to the perpetuation of waste pickers' poverty (Wood 2003). Claiming that it was upon their power to act differently, this thesis has sought to demonstrate how the political-economic, semiotic, material and spatio-temporal practices of these market players contribute to the production and reproduction of a certain configuration of the

recycling economy that results in the adverse incorporation of waste pickers, hindering their empowerment.

Solutions are drawn in response to how problems are defined; "the representation of a problem forecloses some forms of action while allowing others to make sense" (Liboiron 2016:88). By shedding light on the political-economic, semiotic, material and spatio-temporal dimensions of the recycling economy, this thesis challenges the current representation of the causes of waste pickers' poverty, changing the focus from proximate to root causes. In so doing, it hopes to broaden the scope of policy responses and contribute to opening up new forms of actions previously unthought-of for the promotion of their empowerment. As concerns the critique of classic approaches to development that permeates this thesis, my contribution resides not in the originality of my conclusions, but in strengthening an already consolidated critical development studies tradition, providing renewed arguments for rethinking development based on the fusion of approaches and concepts belonging to different disciplines, some of which are not usually part of the development studies toolkit and lexicon.

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